Other Scales and Their Defects

Toledo Scale Company
Toledo, Ohio
U. S. A.

Other Scales

AND

Their Defects

Toledo Scale Co.

Toledo, Ohio

Canadian Factory, Windsor, Ontario

Branch Offices and Service
Stations in all Large Cities

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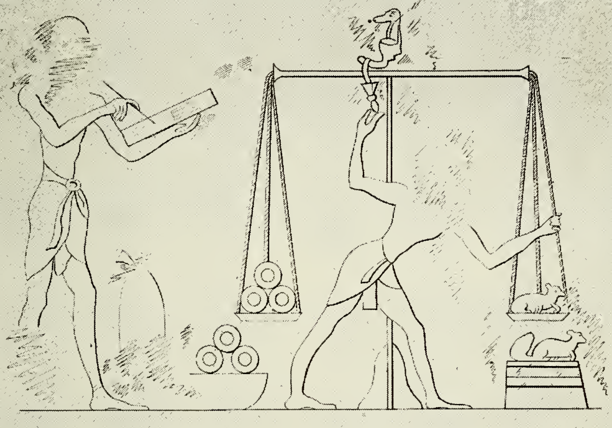
SCALES

FROM THE EARLIEST TIMES TO THE PRESENT

Since this is a book for the purpose of informing our salesmen and scale users concerning the defects in various types of scales, it is appropriate that we print reproductions of a series of plates which we have in our office, showing scales from the very earliest times and briefly listing the main defects of the older forms of weighing devices.



SUSPENDED EVEN BALANCE

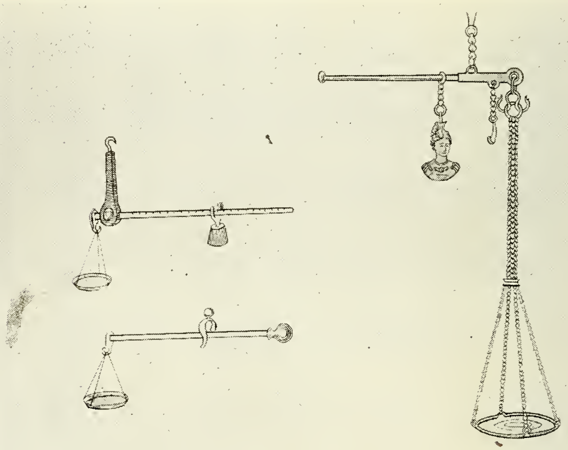
OBJECTIONS:

1st Always requiring weights equal to the commodity weighed.

2d The swinging of the pans in placing the commodity and weights upon them.

3d The amount of time consumed and the difficulty in obtaining a balance, resulted in the giving of overweight almost invariably.

For details concerning the defects of the even-balance scale, **see pages 14-17.**



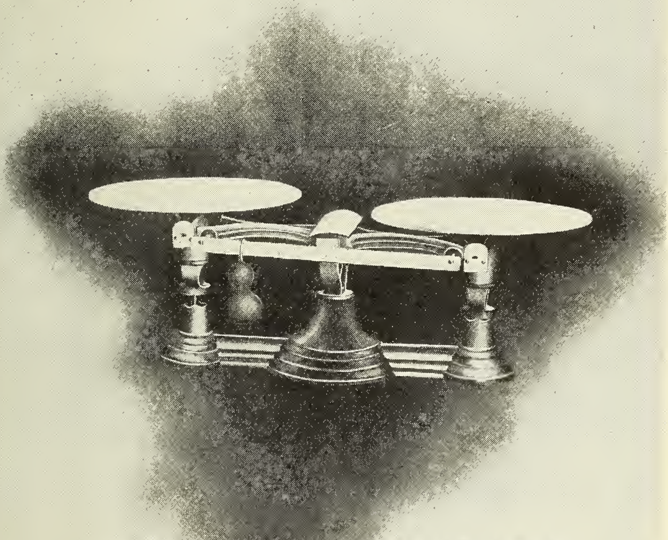
STEELYARD

OBJECTIONS:

1st The swinging of the pan same as in the Suspended Even Balance.

2d To obtain correct weight the beam had to be horizontal, which was so difficult to determine that the giving of overweight was universal.

Since the steelyard is practically obsolete, we are not going into details concerning its defects. They must be so obvious to everyone that no modern concern of any sort would attempt to get acurate weights on the steelyard.

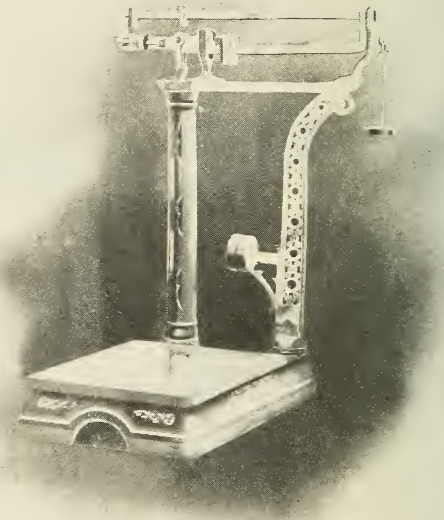


EVEN BALANCE SCALE

OBJECTIONS:

1st The necessity of using a poise and handling numerous weights.
2d The amount of time consumed, and the difficulty in getting a balance.
3d The consequent giving of overweight.
4th The absence of a tare beam.

This is a more modern form of the even-balance scale than that shown on page 5. It has many of the defects of the earliest type and many of its own. **See pages 14-17.**

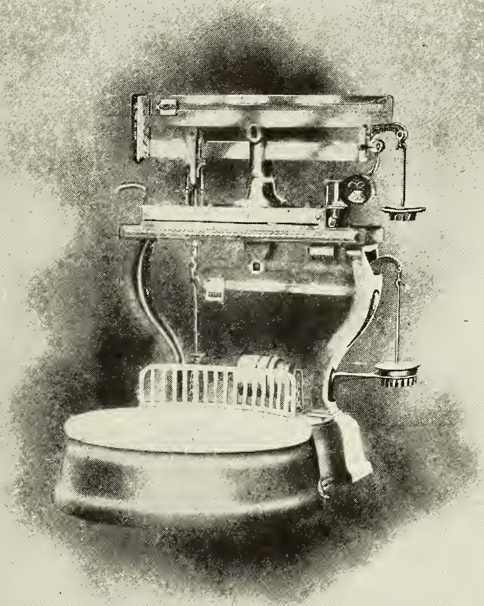


FOUR POINT PLATFORM SCALE

OBJECTIONS:

1st The sacrifice of sensitiveness due to the increased number of bearings.
2d The use of a poise and loose weights necessitating many hand operations.
3d The difficulty and time required to balance the beam in the center of the gate.
4th The consequent universal giving of overweight.

For detailed explanation of defects in this type of scale, see page 101.



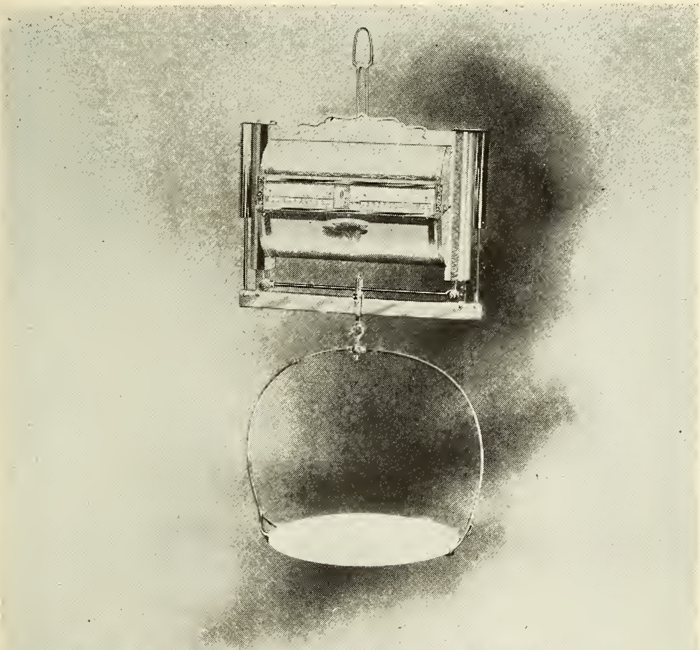
COMPUTING PLATFORM SCALE

OBJECTIONS:

1st A lack of sensitiveness due to the great number of bearings.
2d The use of a poise and loose weights, necessitating many hand operations.
3d Liability to errors caused by the number of hand operations.
4th Its inability to weigh and compute at the same time.
5th The loss of time through having to use a poise and loose weights.
6th The difficulty and time required to balance the beam in the center of the gate.
7th The consequent giving of overweight.

For further details concerning defects of this type of scale, see page 40.

In our opinion, all spring scales are inaccurate and undesirable. We think that the old-style spring balance is particularly objectionable and particularly undesirable in these days of high prices and close margins. For details concerning such scales, see pages 52 to 60.



THE SPRING BALANCE CYLINDER COMPUTING SCALE

OBJECTIONS:

1st The unreliability of springs due to their stretching and becoming impaired by constant use.

2d The expansion and contraction of the springs due to changes of temperature, constantly varying their tension.

3d The consequent inaccuracies in weighing and computing.

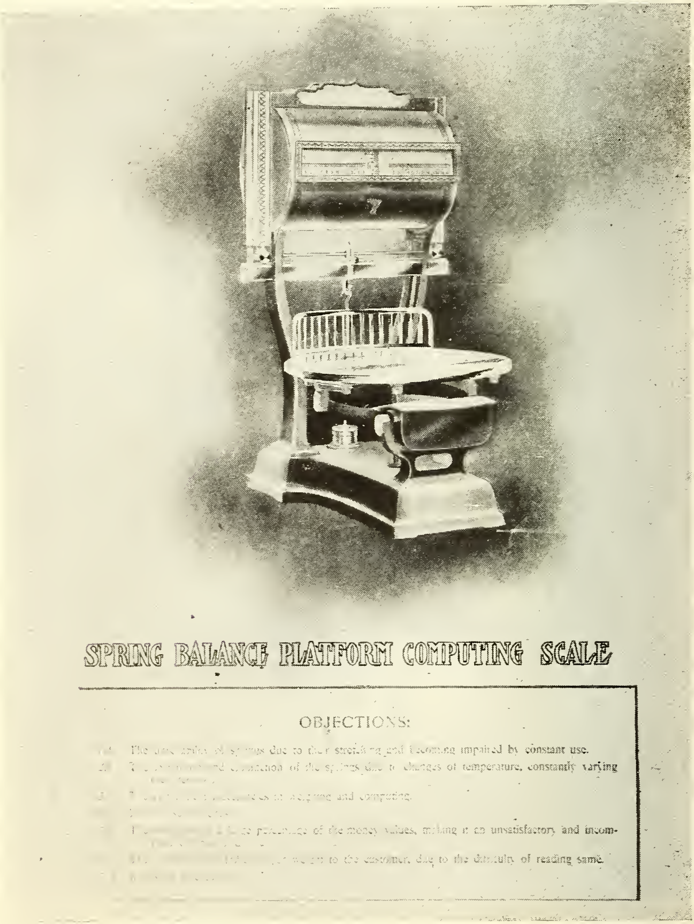
4th Lack of sensitiveness.

5th The omission of a large percentage of the money values, making it an unsatisfactory and incomplete computing device.

6th The unsatisfactory indication of weight to customer, due to the difficulty of reading the same.

7th Objectionable swinging and noise made by the scale in operation.

In order to get the benefit of the computing feature, something might be sacrificed, if it were necessary, for the computing feature is undoubtedly valuable. But it is not necessary to sacrifice anything. Therefore why do it? See pages 52 and 72 for details concerning the defects of this scale.



In addition to accuracy, merchants find that a good reputation in the scale they use is of great value. See pages 52 and 81 for the various reasons why this scale must have a very bad reputation.

The highest type of modern weighing equipment—the Toledo Springless Automatic Computing Scale, accurate to the last possible degree, sensitive almost to the fall of a feather, durable beyond all expectation, highly regarded by the buying public.

OTHER SCALES AND THEIR DEFECTS

THE Toledo salesman should have a thorough knowledge of the defects of scales of other makes. Frequently such knowledge will enable him to perform a genuine service for a merchant who, without realizing it, is using or contemplating the purchase of weighing equipment that is unsuitable, or is causing or may cause him serious losses.

We have made an effort to illustrate and point out the defects of practically every scale that the salesman is apt to encounter. It is needless to say that if we attempted to illustrate every type of scale in existence, we would almost have to print an encyclopaedia. Therefore should you occasionally encounter a scale that you cannot find listed here, get the name and if possible the date of manufacture and send this information to our Engineering Department and we will try to tell you exactly wherein this scale is deficient. As a rule scales not shown here are no longer manufactured.

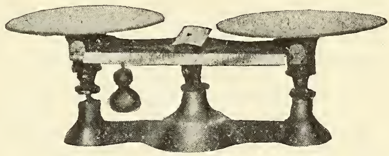
Let us first take up and consider the objections to the even-balance scale.

EVEN-BALANCE SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the even-balance scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the makers of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.



Even-Balance Scale

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

There are many varieties of this scale, but the illustration shown herewith is typical and will serve quite well in the discussion of these scales.

In a strict sense of the word this is not really a scale, but is only a balance, weight on one end of the lever balancing the commodity on the other. This type of weighing device as a rule subjects the user to greater losses of time and to greater losses from inaccuracies than any other scale.

The user ordinarily gives what is termed "down-weight"—that is to say he continues to pour whatever is being weighed, into the scoop until it actually goes down. This has become almost a necessity because customers invariably believe that the scoop or pan should go down to insure correct weight, when as a matter of actual fact if it does go down, from ¼ to 1 ounce or more of overweight is given. Correct weight would be a perfectly even-balance. As the first indication given by the scale is when the pan goes down, about the only way to get a balance is to take goods out, a pinch at a time, which is very objectionable to customers. Anything different from downweight impresses customers with the idea that they are not getting what they pay for, and that the merchant is of the petty, stingy, hair-splitting type. This idea being so general, merchants are obliged to conform to custom and give downweight. The very term "downweight" was invented to apply to this type of scale, and is firmly associated with it. But when the pan goes down, the merchant has no means of knowing how much in excess of the actual weight has been put on to make the pan go down. With careless clerks this excess is often more than an ounce, thus throwing away all profit on the transaction.

Another evil resulting from the frequent inaccuracy of this scale is the possibility of giving shortweight. It is so easy to make a mistake in the balancing weight that is set on the pan.

And this danger of giving shortweight is further increased by the equipment of many of these even-balance scales with what is called a tare beam. This is particularly undesirable as there is nothing to indicate to the customer or remind the merchant when the poise on this tare beam is moved from the zero position. It is also a frequent cause of error for the reason that the poise, not being automatically locked in the zero position, may easily become moved, causing serious inaccuracies.

Then, owing to the necessity of a number of loose weights, many hand movements are required to weigh with this type of scale, and the misplacing of these loose weights is constantly causing annoyances and loss of time.

In weighing, say 25 pounds, on these scales, the operator has not only to lift 25 pounds of goods into the scoop cr onto the pan, but must lift 25 pounds of weights to off-set it. These weights all have to be taken off again, making necessary numerous hand movements. This throws a 50-pound strain on the two center bearings which soon nicks and dulls them, greatly increasing the friction and destroying their sensitiveness for light drafts, so that still greater amounts of overweight must be given in order to make the pan go down. Furthermore, the weighing of 25 pounds obliges the operator to lift 100 pounds or just four times as much as he actually wishes to weigh. On other scales he would only have to lift twice as much as he wishes to weigh.

Needless to say, the sensitiveness of these scales is very shortlived; the bearings are nicked and bruised by the jar of the scale and when a weight is lifted from one side, the other side goes down on the bearings with a bang, and as we have just pointed out, the more the bearings become worn, the greater the amount of overweight that it is necessary to give in order to make the pan go down. And when you consider that only a half ounce of overweight on a pound transaction robs the average merchant of more than 30% of his profit on that transaction, you can see what an undesirable device is the ordinary even-balance scale.

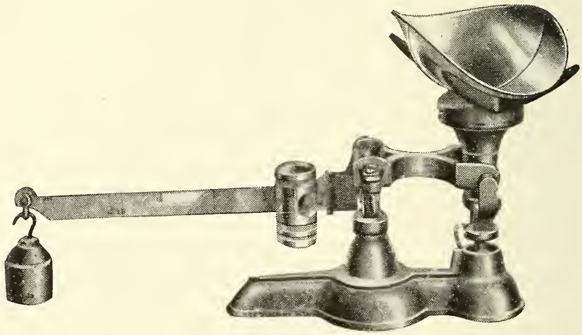
Another objectionable feature is the absence of a dash pot, the function of which is to prevent sudden jar on the bearings and pivots, and at the same time check the vibration. These scales are rarely equipped with dash pots and, of course, go banging up and down as already described, to the ultimate destruction of any reasonable degree of sensitiveness.

Another great objection to these scales is the fact that they do not compute. This causes much loss of time. The dealer is forced to make all his computations mentally, not only resulting in loss of time, but in many mistakes. This is particularly true when selling odd amounts such as 25 cents' worth of sugar at 7½c. a pound, 10 cents' worth of cheese at 22c a pound, 10 cents' worth of tea at 55c a pound, etc. These transactions are constantly occurring and few of them can be figured out correctly without a great deal of time and trouble.

This scale requires the use of loose weights, which become lost or inaccurate by accumulation of dirt, dust, grease, etc.

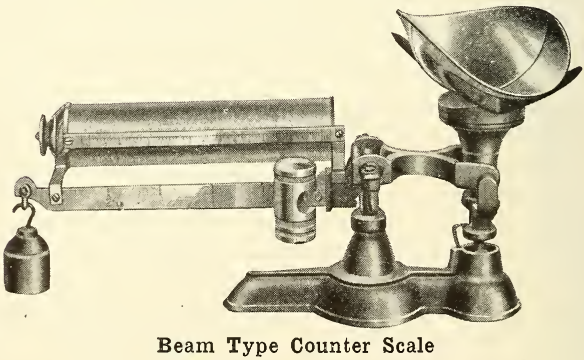
BEAM TYPE COUNTER SCALES

In this section we also print two pictures of a scale that has practically all of the objections of the crude even-balance scale, and a few objections of its own. The type



Beam Type Counter Scale

shown in the upper illustration is occasionally found in fruit stores and small groceries and its main objection, in addition to the objections to the ordinary type of even-balance scale, is that the weight at the end of the beam swings in weighing, causing inaccuracies, often causing



Beam Type Counter Scale

the merchant to give a considerable quantity of over-weight. Another objection is that errors are constantly made in the shifting of the poise along the beam.

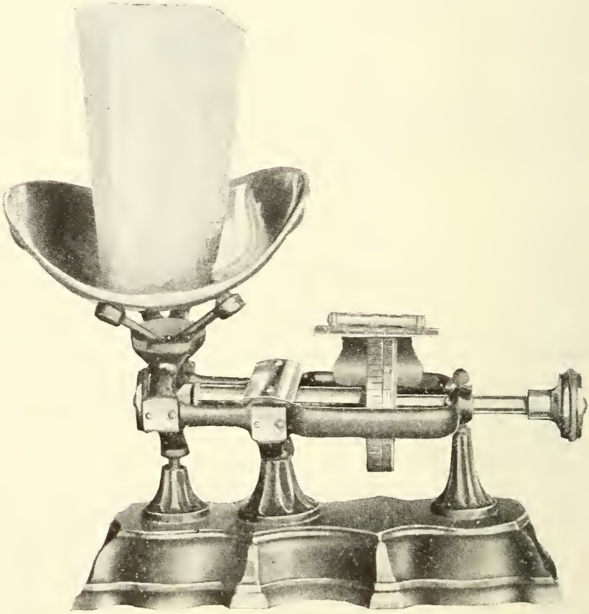
Where a scale of this type is graduated in ounces, it is impossible to weigh more or less than an ounce. This frequently necessitates the giving of overweight.

One way of demonstrating the amount given in overweight on the average even-balance scale or on such a scale as is shown on page 18, is to put 10 pounds of weight on each end of the scale, or set the poise at 10 pounds and put weight in the pan until the scale balances absolutely even. Then put on small visiting cards until the commodity pan actually goes down the way it always goes down in the average draft. Then take those cards and place them on a Toledo Scale and show how the Toledo will immediately show their weight and their value. Another way is to ask the merchant to weigh out four drafts of a pound each and then weigh them all together and note overweight.

MICROMETER SCALE

Another type of even-balance scale which is occasionally found in use, is the micrometer scale. In addition to many of the disadvantages of even-balance scales, it has a few of its own. A great deal of time is required to get a balance, even more as a rule than on the ordinary even-balance scale, for the shaft containing the counterbalancing weight must be revolved back and forth until a balance is obtained, and the slightest movement of the shaft throws the scale out of balance, causing the merchant to give shortweight or obliging him to pour in a great deal of overweight.

We regard this as an exceedingly dangerous scale, particularly in these days of high prices and very close margins. All micrometer scales should be carefully balanced before each weighing, and the balancing takes a great deal of time, after the commodity is placed upon the platter. It requires quite a good deal of fiddling back and forth with the revolving shaft to bring the scale to an exact balance. Furthermore, serious discrepancies may be caused by the rather wide lines on the micrometer weight. Unless this is set exactly in the center of these lines, the scale will not weigh accurately. Furthermore, two different people would get different results from this scale, because they must depend upon their judgment as to where the revolving weight must be set for a given amount. Some men would think that it should go a little farther forward, some a little farther back. The customer cannot see whether or not the scale is set to give the amount paid for.



Micrometer Scale

As we have said before, these are the objections to this scale alone and are in addition to the usual objections to almost all types of even-balance or beam counter scales. For example, the absence of a dash-pot in this scale is as serious a defect as in the ordinary even-balance scale.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

ANDERSON COMPUTING SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Anderson Computing Scale, apply generally to all such scales which have come to our notice up to this date, including the later type known as Model 85, built by the Detroit Automatic Scale Company, which is a slightly modified form of the Anderson, and which we also illustrate. Many of these defects must be known to the makers of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

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Engineering Department.

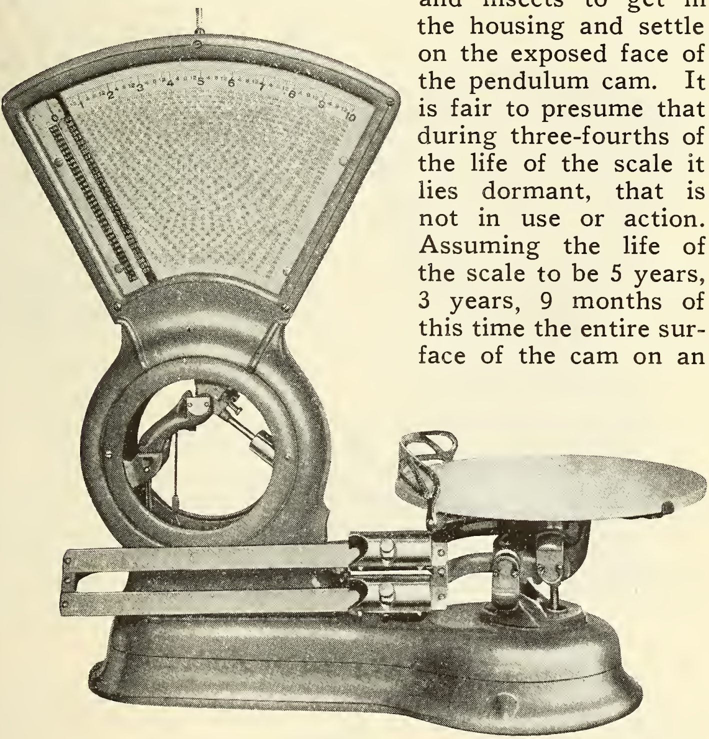
TOLEDO SCALE COMPANY.

The tare poise locking screws in most of the older types of these scales may become loosened and fall out as they are not provided with proper means to retain them. This, of course, would cause inaccuracy in weighing both because of the difference in weight of the tare poise when the locking screw has fallen out and because this leaves the poise free to slide back and forth on the tare beam.

The tare beam on some scales of this type has only one set of weight graduations and two poises. Either one poise or both poises can be set at approximately the same graduation on the beam and the indication on the beam would be the same in both cases, which with both set would be only half of the correct weight. This means a great deal of confusion between the chart and the beam indications. It is a source of almost constant error.

On the later type Model 85 built by the Detroit Automatic Scale Company, there are two beams with a poise on each beam. Look at the illustration. Note the short upright bar on the left which connects these two beams together. When one or the other of the poises is slid along and strikes against this bar, it may easily jar the beam so that this upright bar is no longer at right angles with the beams. In other words, the force of the poise hitting against this bar just pushes it along a sixteenth or an eight of an inch. Of course, this may result in the most serious kind of inaccuracies on all future weighings. When the beam has thus been pushed out of its proper place by the action of the poise hitting against the short upright bar, it is impossible for the poise to be drawn back to a correct zero position because the bar "A" and the corresponding one at the end of the beams are no longer upright but are in a slightly slanting position.

The large hole in the housing where the main lever and platter-supporting casting enter allows dirt, dust and insects to get in the housing and settle on the exposed face of the pendulum cam. It is fair to presume that during three-fourths of the life of the scale it lies dormant, that is not in use or action. Assuming the life of the scale to be 5 years, 3 years, 9 months of this time the entire surface of the cam on an Anderson or Detroit Automatic Model 85 lies exposed to insects, dust and corrosion. In weighing operations the ribbon must of necessity pass over these particles of dirt on the surface of the cam, which would naturally cause serious inaccuracies in weighing.

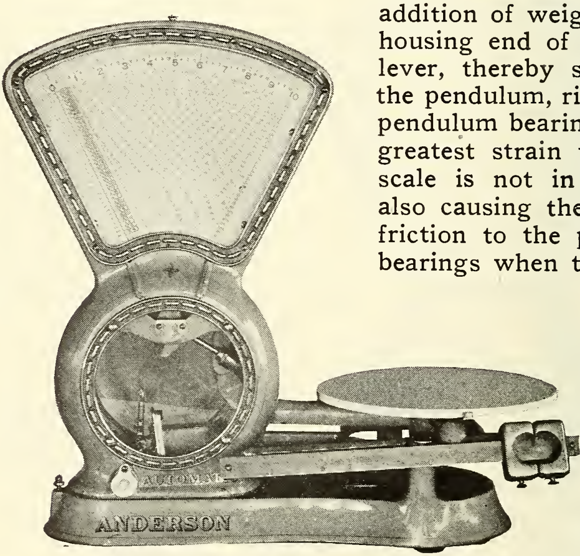


Detroit Automatic

One of the worst features of this scale is the inverted pendulum, which is a reversal of the true principle of pendulum construction.

The manner of constructing the agate bridge which supports the pendulum is another serious weakness in this scale's construction.

It also has many other bad features—for example, it enforces a large addition of weight to the housing end of the main lever, thereby subjecting the pendulum, ribbon and pendulum bearings to the greatest strain when the scale is not in use and also causing the greatest friction to the pendulum bearings when the smallest drafts are weighed. This means greater inaccuracies on small drafts than on large. Now consider that an overdraft of only ½ ounce on a pound transaction robs the average merchant of over 30% of his profit, but that on a ½ pound transaction it robs him of over 60% of his profit. On this scale the overdrafts are largest on the small transactions, which are becoming constantly more frequent. This is a very serious objection.



Anderson

The tare beams on both the Anderson and Detroit Automatic Scales read from right to left which is the reverse of all other makes of scales and is liable to cause mistakes in reading.

In the Detroit Automatic Fan Scale the lever projects through both sides of the housing forming an additional opening for dust and dirt to collect and cause greater errors.

The location of the dash pot and the small hole through which it is operated make the adjustment of the dash pot on the Anderson Scale very awkward and difficult. The fact that the opening through which the dash pot is regulated on the No. 85 Detroit Automatic, a slightly modified type of the Anderson Scale, is on the opposite side of the scale from which the merchant stands makes it difficult to get at the dash pot.

Anderson Scales of the earlier type are equipped with ornamental brass scrolls, the finish of which soon wears off. These scrolls accumulate dirt, and verdigris, are difficult to keep clean and soon become unsanitary and unsightly, giving the scale an unpleasing appearance.

When possible test out such scales to their full chart capacity and see if they weigh accurately throughout.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

ANGLDILE COMPUTING SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Angldile Computing Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

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TOLEDO SCALE COMPANY.

It is almost impossible to read accurately the value on an Angldile Scale, because the exact angle for reading cannot be determined by sight. As a rule, several different persons will read as many different values for the same article placed upon the platter.

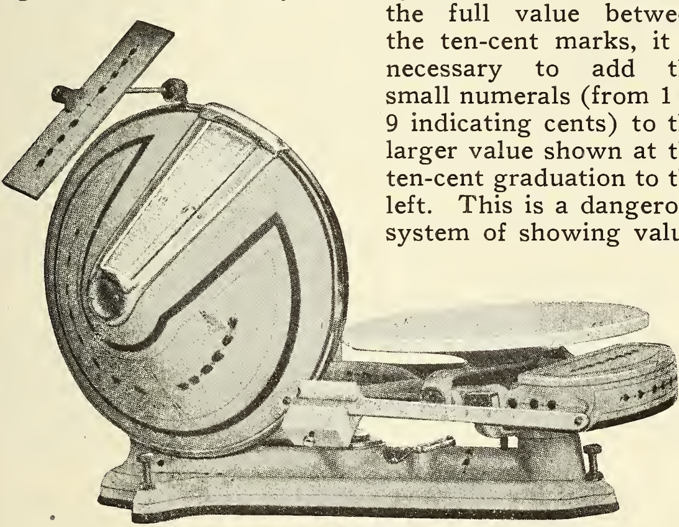
Another defect is the fact that the dial indicator on the customer's side does not indicate accurately for the reason that the center of the dial is not on a level with the eye. It is too low. Examine carefully such a scale and see if it is not true that the dial can be read accurately only when the indicator is in a vertical position at zero or one-half its capacity.

The pointer on the hand indicating the weight to the customer is too wide and in many instances is so far from the dial that accurate reading is impossible.

The indicating wire being far from the cone-shaped chart, and the reading angle being uncertain, make accurate reading of the computations extremely difficult.

This indicating wire is not placed any closer to the chart owing to the peculiar and poor mechanical construction of the chart.

The cone-shaped computing chart does not show every full value in plain figures. The values in plain figures are shown only at every ten cents. To obtain the full value between the ten-cent marks, it is necessary to add the small numerals (from 1 to 9 indicating cents) to the larger value shown at the ten-cent graduation to the left. This is a dangerous system of showing value, as a computing scale should take off the mind of the merchant all mental computation. Put a weight on a scale which, at some low price per pound, comes to 17 or 18 cents, and you will see that one might read the value as 7 or 8 cents. In some cases the preceding ten cent value is hidden behind the casing.



Angldile

It is extremely difficult to obtain absolute accuracy in cone-shaped computing charts. The most difficulty is encountered in the construction of the cone charts because of their small diameter at the low prices per pound. This results in scales equipped with such charts generally showing very serious inaccuracy ranging from a fraction of an ounce in weight to as much as 3 cents in money values. It is also extremely difficult to join such charts accurately and there are often serious discrepancies at the point of juncture.

Another serious objection is the fact that owing to the large diameter of the cone-shaped chart at the high price per pound, and the weaknesses of its construction, inaccuracies develop after the scale has been in use only a short time. This is partly due to the fact that the part of the chart with a large diameter naturally moves at a very high velocity, causing a severe jar when a heavy weight is placed upon the platter, there being no shock absorber between the beam and chart. Inaccuracies can be detected by placing a weight on the scale and observing the values at 4 cents and 40 cents per pound, when they will probably be found not in proper relation and the weight indication to the merchant shown by the cone-shaped chart will be found to differ from the weight indication shown to the customer by the dial.

It is highly important, in producing a revolving chart, to have it properly balanced. Adjustable means should always be provided for this. In earlier types, note the crude manner in which the balance is secured in this cone chart. On more recent models this has been corrected.

Many of the adjustments of the weighing mechanism are so located and mounted as to require an expert provided with suitable tools and equipment to make the adjustments.

It is generally conceded that it is impossible to locate accurately a value by a figure alone as in Angldile Scales. Notwithstanding the fact that the cent values between the 10 cent marks are expressed in figures, there is also for each cent, from 3 cents to 7 cents, inclusive, a line graduation indicating the exact location for the cent, but you will observe that the values expressed at the ten cent marks and printed in bold, black face figures cover up and obliterate the cent graduations for 1 cent and 2 cents and for 8 cents and 9 cents in the majority of cases. Technically speaking there is neither a figure nor a line to represent the value at these points. At the low price per pound, the 1 cent and 9 cent graduations only are hidden.

A hand operation is necessary to fasten the poise in its zero position on the tare beam. The time consumed and the unreliability of this method is apparent. If the poise is not exactly located and securely fastened, it may cause loss to the merchant in overweight.

As there is no shock-absorbing device between the main lever and the rack which drives the pinion of the chart, the teeth of the rack and pinion are subjected, by ordinary use of the scale, to exceedingly severe strain, causing them soon to become damaged and the scale to weigh inaccurately. This is due to the large diameter of the chart which makes it hard to start and stop quickly.

The scale is hard to level on an uneven counter.

The platter is too small.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

STRUBLER DOUBLE PENDULUM COMPUTING SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Strubler Double Pendulum Computing Scale, No. 40, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

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Engineering Department.

TOLEDO SCALE COMPANY.

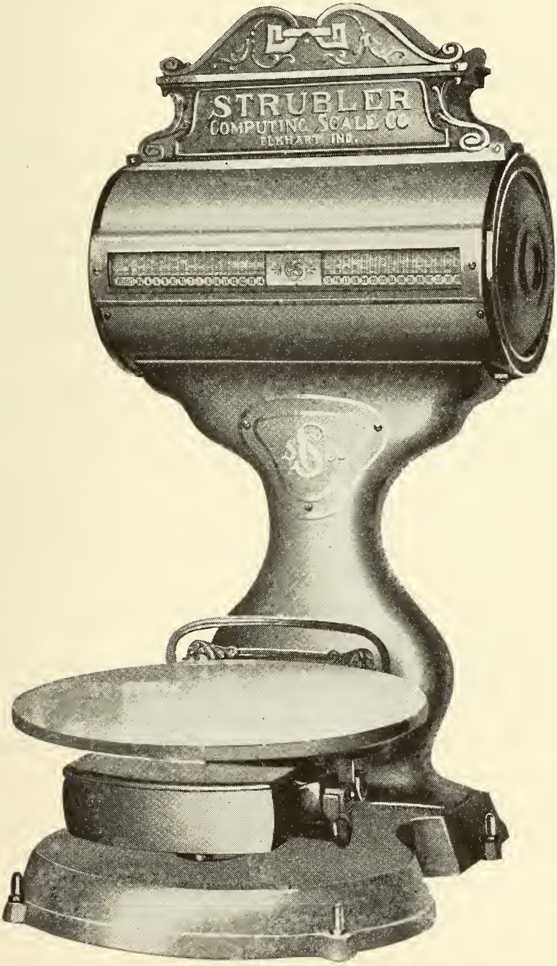
The design of this scale is awkward and unsightly in appearance. Observe the top-heavy appearance of the chart housing. Now, remember that the double pendulums in this scale are on top of the chart housing and that the two pendulums are very heavy chunks of lead. Anyone can see what bad construction this is. The slightest movement at the base of the scale would be multiplied many times in the double pendulums, which would increase and tend to cause grave inaccuracies.

The finish and workmanship throughout the scale seem to be of very poor quality. There are too many joints between the main lever and the pendulums.

Decorated brass scrolls such as are used in this scale are very difficult to keep clean. They often become coated with filth and verdigris and are apt to infect commodities weighed over such a scale.

The leveling screws are very small in diameter and easily bent when scale is moved, which would put them out of commission.

The scale is not equipped with means for determining when it is level. Butcher counters are usually made low on operator's side for the purpose of easy drainage.



Strubler

Therefore, if the scale were not leveled up from front to back, inaccuracies would result.

The distance between the fulcrum and the platform bearing pivots in the Strubler Scale is $1\frac{1}{2}$ inches, while in the Toledo this distance is $2\frac{7}{16}$ inches, which makes the lever in the Strubler Scale multiply nearly twice as much as in the Toledo. The consequence of this is that any error resulting from rust, dirt or wear in the main lever bearings, would be multiplied in the same proportion.

The base casting is very weak and might easily bend downward when weights are placed upon the platform. This would cause the shift to be incorrect. To make matters worse, the shift adjustment is of such construction as to necessitate the moving of the scale before changes can be made in it. But to further increase the difficulty, the short pivot distance in the lever renders it exceedingly unlikely that the shift will remain accurate more than a very short time.

The dash pot is placed in the housing of this scale and cannot be regulated from the operator's side, and it cannot be regulated at all without first removing a scroll. The construction is such that oil might easily pump out in the quick operation of the scale and the hole in the dash pot cap is so large that dust would enter the pot.

The chart is made in two sections with the pinion which operates it in the center. These two sections of the chart are fastened to the chart shaft by means of set screws, which is not a secure method. The result is, that the charts may slip on the chart shaft and incorrect weights and values are the inevitable consequence. The chart of the thirty pound scale has one less price per pound than on the Toledo cylinder scale of the same capacity.

The shortness of the bearing where the rack rod connects to the end of the lever does not hold the rack in a vertical position so as to allow it to mesh properly in line with the teeth of the pinion. The result is that the rack is constantly rubbing against the rack guide throughout the weighing, causing considerable friction in the scale. The adjusting nut on the rack rod has no locking screw and would easily be turned by vibration, which would cause the scale to weigh incorrectly. The rack has no shock absorber between the lever and rack to preserve the accuracy of the teeth of rack and pinion.

This is a serious defect, for, when heavy loads are suddenly placed upon the platter of the scale, the shock is communicated directly to the rack and pinion and through them to the chart, resulting in rapid wear of the rack and pinion and perhaps causing charts to slip on the chart shaft.

The mounting of the pendulums above the chart housing makes the scale exceedingly high and top-heavy. To avoid making the scale still higher, it was necessary on account of the leverage to make the pendulum stems very short, which renders the scale far less accurate than it probably would be if a longer stem and heavier pendulum could be used as in the Toledo cylinder scale.

The pendulum weights are cylindrical in shape and are adjusted up and down on the threaded pendulum stems. To adjust these weights at all would require a half turn of the weight, and would bring the set screw which locks the weight to the stem on the inside where it would strike the pendulum bumpers. The adjusting screws for adjusting the cams are not central to the pendulum stem and would throw an undue strain on the mechanism. The pendulum weights are not securely locked on the stems. In consequence of this they might easily change their position and cause serious inaccuracies in weighing.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.
TOLEDO SCALE COMPANY.

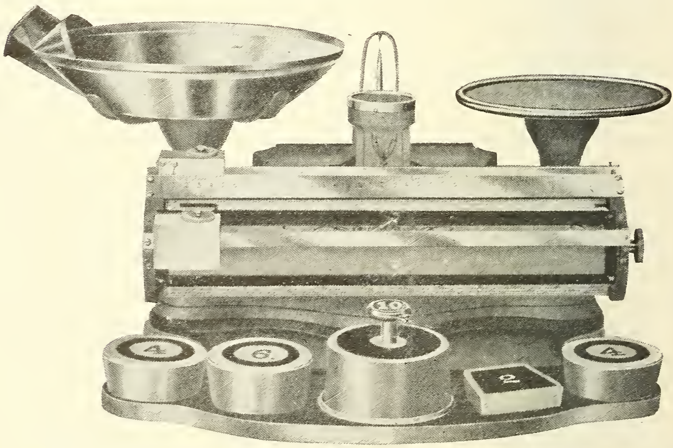
DAYTON No. 38

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Dayton No. 38, even-balance scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts have been made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competi-



Dayton No. 38. We are informed that this scale is no longer being manufactured, but salesmen may occasionally encounter it.

tors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

One great objection to this type of scale is the fact that it is an even-balance scale, which is a type of scale upon which more overweight is given than any class of scales on the market. This arises from two causes: first,—on this type of scale the customers believe the pan should go down to insure their getting full weight. Because of this idea being so general with the trade, the grocer has to subscribe to this idea and ordinarily does give downweight. (See further objections to even-balance scale under that heading, page 14.)

The price on the computing cylinder has to be set by hand, which is always done with great liability to mistake in setting or mistake in reading, both of which require great care and consume considerable time. These defects are so pronounced that the grocer often gives up in disgust and will admit that he does not use the computing part, in which event he has paid a high price for a lop-sided, complicated even-balance scale while he could have bought one for a lower price which would have been just as good.

Many of these scales do not compute correctly where fractional prices are used. This was clearly demonstrated by Wells Bros., of Chicago, who, when they found out that the scale did not compute correctly, refused to pay for it, took the matter into courts where it was demonstrated to the satisfaction of the court that it was incorrect, and the court therefore not only released them from paying their notes, but gave them a judgment against the manufacturers for the full amount they had already paid.

The capacity of this scale is 27 pounds. To weigh 27 pounds on this scale in a single draft, requires exactly twelve hand movements, ten of which are to put on and take off the weights and move the poise, and two of which are to put on and take off the commodity weighed, requiring the user to lift 100 pounds.

In weighing 25 pounds on this scale, the two center bearings are compelled to support the entire weight of 50 pounds. (25 pounds being in each pan) which is a great burden for two bearings to sustain, and often results in the pivots becoming nicked and agates chipped and broken from time to time. This affects their sensitiveness and soon makes them unreliable and inaccurate in small drafts. To compute over 2 pounds a mental calculation is necessary and an additional one for each weight used.

The so-called near-weight detector is often a delusion, or would be were it not for the fact that it is usually out of order anyway, so that the dealer never depends upon it. As it is, it stands as a confession of the maker that overweight is its greatest defect.

These scales are usually shortlived on account of the bearings getting nicked and bruised by the jar of the scale. Every time you lift a weight from one side, the other sides goes down on the bearings with a bang, greatly to their injury.

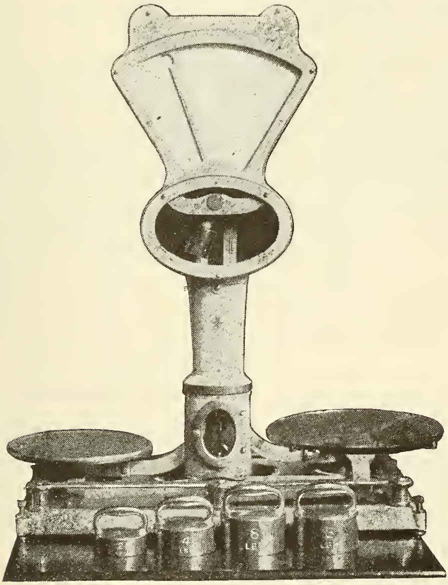
The slot in the computer on these scales being in front of the scale requires the passing of all goods over this slot. In consequence, it becomes a catch-all for dirt, sugar, lard, butter, and the different things that are weighed on the scale, so that the computer becomes filthy and unsightly and very much harder to read.

The shift on these scales will sometimes vary from 2 to 4 ounces.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.
TOLEDO SCALE COMPANY.

DAYTON Nos. 120 AND 220, OR LIGHTHOUSE SCALE



Note:—The No. 120 is the computing scale described, but the 220 is quite similar in appearance and construction, practically the only difference being, we are informed, that it is not a computing scale.

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Dayton Nos. 120 and 220, often known as the Lighthouse scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines, which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth, or of having made any misrepresentation whatsoever.

Engineering Department,
TOLEDO SCALE COMPANY.

Toledo, Ohio, May 1, 1918.

One of the chief defects of these scales is that they are even-balance scales, the automatic feature being of use only up to two pounds capacity. They have many of the defects of the even-balance scale and quite a number of their own.

The automatic computing capacity is only two pounds.

Prices computed up to the capacity of two pounds are from 10 cents to $1.00, making no computation less than 10 cents per pound. At all prices from 10 cents to 80 cents the lines on the chart are one-cent lines, but at 90 cents and $1.00 the lines indicate five cents. As the majority of prices used have one-cent graduations the user becomes accustomed to reading the one-cent line, so when using the prices 90 cents to $1.00, he is very liable to mistake a five-cent line for a one-cent line and so read it.

Many of the computations are omitted. For example, if the lines on the chart at the prices 90 cents and $1.00, are five-cent graduations, there is no provision for the intermediate prices. Take another example, if 51, 52, 54, 56, 57, 58 or 59 cents' worth is on the scale the user would be compelled to guess, the indication being in five-cent multiples only.

On the chart the pound graduations are such heavy lines that accurate reading is difficult. Demonstrate by pouring on some commodity, stopping on the left-hand edge of the pound graduation, noting the indication and then adding considerable weight showing that the hand will still remain on the line and that such wide lines permit serious inaccuracies in weighing.

The chart is very hard to read at prices from 60 cents to 80 cents, because the one-cent marks all extend below the curved line which crowds them very closely together.

The wire on the indicating hand throws shadows so that the shadow is liable to be mistaken for the wire and wrong reading results. Further, if the wire line covers up the cent indication, which should be read, it forces the user to calculate from the line just ahead of the wire or the one just following it.

Since the automatic weighing capacity is only two pounds, loose weights have to be handled for the major part of the weighing, requiring hand operations which result in mistakes in calculations. In addition to this, the weights are almost certain to get lost, and they may become coated with oil, grease, dirt, dust, etc., thus rendering them inaccurate and necessitating the giving of large quantities of overweight.

Putting on and off of loose weights causes somewhat the same sort of jarring on the bearings that occurs when loose weights are placed upon an ordinary even-balance scale. This jarring is not only noisy but soon destroys the sensitiveness of the scale, thus necessitating the giving of large quantities of overweight.

Since the indication of weight to the customer is limited to two pounds, the scale ignores the customer beyond that weight.

The base of the scale being open, it is a catch-all for dirt. This can be seen by the customer, making a very bad impression, or else requiring the merchant to remove his scale frequently to clean the counter underneath.

Owing to the base being open, crackers, cakes or other commodities are liable to drop through and lodge beneath the lever, interfering with the weighing or causing the merchant to give large quantities of overweight.

There is apt to be considerable variation in the shift.

The oil is liable to pump out of the dash-pot.

The scale is cheaply constructed, having steel bearings in the housing instead of agate. This reduces the sensitiveness of the scale and makes it necessary to give overweight in order to get what looks like an even balance.

The scale has four leveling screws, which make it difficult to level it upon the counter.

Although the manufacturers claim that this scale eliminates the lifting of weights and the figuring of values, results which should be expected of a modern scale and which the manufacturers of this scale apparently realize are most desirable, this scale does not accomplish those results. It is necessary to lift weights and it is necessary to figure values except within a very narrow margin.

Careful study by the salesmen of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device, or those who are contemplating its purchase.

Engineering Department,

TOLEDO SCALE COMPANY.

DAYTON BEAM SCALES

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Dayton Beam Scales, Nos. 1 and 2 and the Majestic No. 40, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

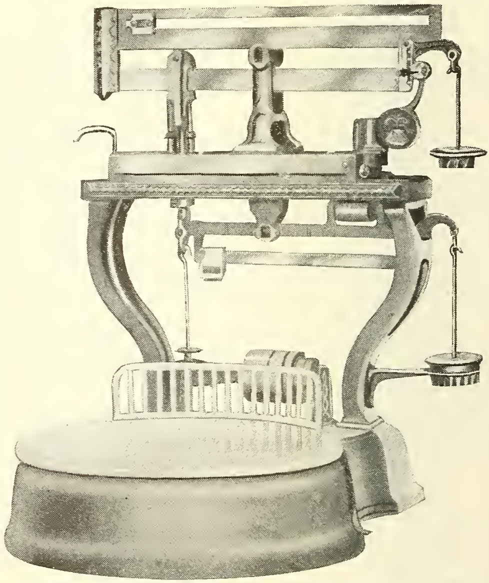
We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

The chief objection to these scales is that they are beam scales. All beam scales are in about the same class and all have pretty much the same vices. The principle of having to balance the long beam in the center of the loop to get correct weight, renders errors unavoidable. The losses caused by overweights on beam scales have contributed more to the failure of grocers than any other one thing. In weighing a pound you can pour on 13, 14, 15, 15½ and 15¾ ounces and you have weighed nothing, nor have you any indication of having weighed anything. As the first indication you get is when the beam starts to move, usually enough is put on to send beam to the top of the loop. This means overweight every time. After you reach the 16 oz., for which your scale is set, the weight sufficient to turn the scale, causing the beam to go to the top of the loop, you may then add 1 ounce, 2 ounces or 20 pounds and the indication is the same. Such scales weigh at just one point only. If the scale is set for a pound you must have an exact 16 ounces on your platform in order to get any indication. Anything below or above that weight leaves your scale perfectly dumb and you entirely in the dark as far as any indication of weight is concerned. This is why overweight is constantly occurring on these scales. The weight necessary to cause the beam to rise will invariably cause it to go to the top of the loop instead of stopping in the center where the correct weight would be.



Dayton Nos. 1 and 2, and Majestic No. 40

Dayton Nos. 1 and 2 are similar in construction, the main difference being the base.

The price always has to be set by hand by moving the frame, which has many complicated details, requiring careful attention of the eye as well as innumerable hand movements, demanding close attention to all these details. The neglect of any one of these numerous details would result in mistakes. This focusing of the eye with additional hand movements to set the price, not only increases liability to mistake but also requires a great deal of time.

Ask the dealer to weigh 4 cents worth of tea or coffee at 16 cents per pound, then 5 cents worth at 20 cents per pound, 15 cents worth at 60 cents per pound and 10 cents worth at 40 cents per pound, leaving the scale set at 40 cents which is your last draft; put the four different weights on, which should be a pound and should show 40 cents. Almost invariably, however, it will show from 41 to 44 cents. Now set your scale at 20 cents per pound and make one draft of 5 cents worth, one of 10 cents and one of 5 cents, which should be a pound. Put them on your scale and you will find it to weigh from 20 to 22 cents. The object in using the different prices is to cause the dealer to reset his scale from time to time. Now ask him to weigh out four separate drafts of 1/4 of a pound each and see if by combining them you have a correct pound; then take a pound and divide it into 1/4 pound drafts. You will find the last one will seldom be an exact quarter. Weigh a 10-pound lot and try to weigh ten separate pounds from it. Weigh one cent's worth at 16 cents per pound.

Set your price to sell 10 cents worth of commodity at 60 cents per pound, put your goods on so the scale balances nicely then reset your scales to 59 cents, 58 cents, 57 cents, 56 cents and 55 cents, and you will find the balance will usually remain the same. Some scales will permit a shifting down as low as 50 cents, on this test.

Set your price to 60 cents per pound; move the poise to 5 cents, put weight on to balance nicely on that basis —then move your poise to 4 cents, then to 6 cents and 7 cents. You will find it will balance on any of these prices, showing a variation of 3 cents.

It is impossible to weigh and compute on these scales at the same time. This greatly complicates the movements necessary in using these scales; is a great disadvantage and greatly increases the work of the dealer, so much so that many dealers do not use the computing features of the scales at all, as they find the loss of time in doing so makes it impracticable, and in the future no merchant will dare to use a scale that does not show weight to customer.

In taking the tare weight one must prepare the scale for this act by sliding the upper poise back to zero. This also complicates it and makes it exceedingly unhandy and annoying to the user.

There is nothing to show when these scales are out of balance, which is a source of constant annoyance to the user, requiring him to put his poise back at zero and make a balancing test from time to time to insure that this scale is in balance. The balance ball of these scales is so placed that children are constantly meddling, throwing the scale out of balance and thereby compelling the dealer to make this balancing test often.

The so-called near-weight detector is usually a delusion, or would be were it not for the fact that it is usually out of order anyway so that the dealer never depends upon it.

The adjustable frame for setting the price rests on four steel wheels running on a steel track which rusts badly, also gets dirty and makes the frame hard to shift.

These scales are very clumsily made and subject to excessive friction, having 26 bearings in all. The constant wear of steel against steel dulls the bearings, greatly affects sensitiveness of the scale, and the longer in use the less sensitive they are. The main or center bearing in the spider is a very heavy clumsy affair, contributing greatly to the friction in these scales. To show that so many bearings do increase friction, if you will break the beam with some commodity, then put on from 25 to 50 pounds and break the beam again, you will find it takes a great deal more to break it with the heavier weight on, owing to the fact that the bearings have been crowded against each other by these weights.

A point claimed for the Dayton Scale is the capacity in weighing. This great weighing capacity is a temptation to the operator to overload the scale. No matter how sensitive the scale may be when new, by placing 40 or 50 pounds of weight on the platform, the bearings are necessarily dulled and the result is that there is increased friction. Increased friction naturally calls for more weight to break the beam. As the friction increases, overweight, which is bad enough when the scale is new, is much increased.

You can weigh on these scales $9.00 worth of goods at 3 cents per pound, which would mean a capacity of 300 pounds. Think what it means to use a scale of that capacity on light drafts. To show the effects of these drafts on the bearings, put your scale at 40 cents per pound, getting a perfect balance; then move it to 3 cents per pound, and then to 60 cents, and you will get a down balance in one case and an up balance in the other.

A weight necessary to cause the beam to go from center of loop to top will show both weight and value on a Toledo.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

DETROIT AUTOMATIC OR STIMPSON PLATFORM SCALE

100 pound scale

Toledo, Ohio, May 1, 1918.

We now come to the 100-pound computing scale of the general type that is sold under the name of the Detroit Automatic or Stimpson No. 70-75, and is sometimes known as the Fairbanks.

The defects, as explained, of the Stimpson Computing Scale, sometimes known as the Detroit Automatic or Fairbanks, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

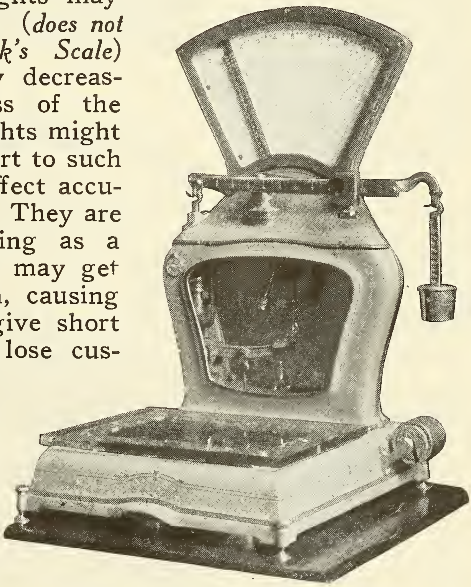
TOLEDO SCALE COMPANY.

One of the very serious defects of this scale is the manner in which the tare beam lever may be easily rocked in its pivots. This, of course, means very rapid wear on the pivots. A sluggish scale necessitates the giving of large quantities of overweight. Another serious objection is the fact that the poise at the end of the tare beam lever may easily swing back and forth, making it difficult to get prompt and accurate readings on the chart. Never lose sight of the fact that sensitiveness and accuracy in a scale are of more importance today than ever before.

Where there is a glass platform, it is apt to become broken in weighing heavy drafts or become accidentally knocked off and broken, causing a delay and expense in replacement.

The total capacity of the scale is 100 pounds, 10 pounds on the chart, 10 pounds on the tare beam and 80 pounds by loose weights. (*Does not apply to Fairbanks' Scale*). To weigh to the total capacity, it is necessary to move the poise on the beam and to add many loose weights. After weighing, it is necessary to return the scale to its normal position, the poise to zero and remove the weights, making many time-consuming hand operations in which the possibilities of error are greatly multiplied.

The loose weights may easily become lost, (*does not apply to Fairbank's Scale*) thereby materially decreasing the usefulness of the scale. These weights might also accumulate dirt to such an extent as to affect accuracy in weighing. They are so handy for using as a hammer that they may get chipped or broken, causing the merchant to give short weight and thus lose customers.



Detroit Automatic or Stimpson

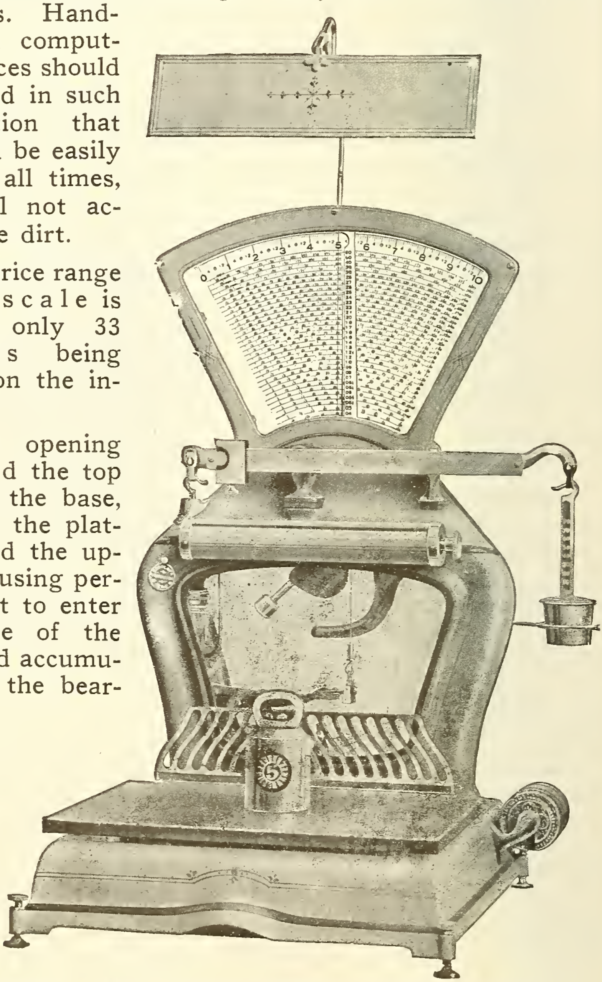
If a heavy draft is to be weighed and this heavy draft is placed on the scale before a sufficient number of counter-balancing loose weights are placed on the hanger, it is a severe strain on the mechanism, as it causes the indicating hand to smash with tremendous force against the right hand side of the housing.

The hanger on which the loose weights are placed when weighing heavy drafts is unprotected. This is dangerous because it is apt to rub against something and cause friction and also cause the merchant to give a large excess of weight.

Some of these scales have been equipped with hand-operating computing cylinders located in a horizontal position on the housing, between the platter and the chart of the scale. Therefore, when large packages are weighed, this hand-operated computing cylinder is often hidden from view, making it very difficult to read the values. Hand-operated computing devices should be placed in such a position that they can be easily read at all times, and will not accumulate dirt.

The price range on this scale is limited, only 33 prices being shown on the indicator.

The opening around the top edge of the base, between the platform and the upright housing permits dirt to enter the base of the scale and accumulate on the bearings, which will increase friction and cause inaccuracies in weighing.



This Stimpson 100-lb. Scale has a Hand Computing Cylinder

The opening in the back of the chart housing, through which the chart is read, is too narrow and makes the customers' reading difficult.

The distance between fulcrum and load bearing pivots is very short. This has a tendency to multiply the error due to wear or any other defects in the pivots. The slightest wear of the load bearing pivot will throw the pivot range out very materially and cause inaccuracies in weighing due to the greater multiplication in the lever pivots.

Tare beam lever pivots do not rest firmly in each bearing, most of the weight being carried on the outer pivot and bearing. This causes the tare beam lever to rest rather insecurely and to be easily shifted out of one bearing, or another, causing excessive wear to the pivot. These bearings are not enclosed or dust-proof.

There is no safety device on the dash pot plunger to prevent injury to the pendulum and indicator when a heavy load is removed from the platform and the poise is shifted to the full capacity.

The indication to the customer being too broad makes accurate reading of weight impossible.

The irregular lines of the scale, the rough joining in the housing with hanger, the holder for loose weights projecting, make the scale unpleasing in appearance.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

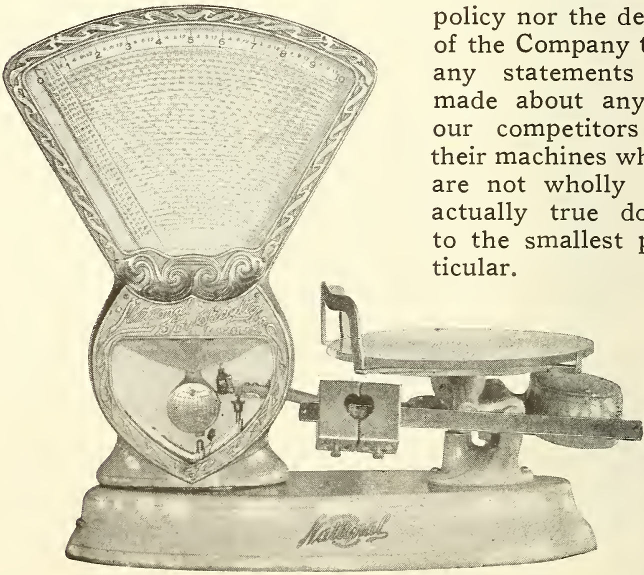
THE NATIONAL FAN SCALE

Toledo, Ohio, May 1, 1918.

The defects of the National Fan Scale, as explained, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales, and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the Company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.



Sometimes called "The National" and sometimes termed Jacobs Brothers, Pennsylvania, Ohio, Lancaster, Howe, Etc.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to tell the prospective purchaser of the scale all you may know about the construction of any scale under discussion.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the Company in the unfair and contemptible position of having stated an untruth, or of having made any misrepresentation whatsoever.

Engineering Department,
TOLEDO SCALE COMPANY.

On the preceding page we illustrate a scale sometimes termed "The National," sometimes called "The Jacobs Brothers," and, sometimes, we have heard, sold under other names. We claimed that this scale was a direct infringement of our patents, and when the matter was submitted to the courts we obtained an injunction against the makers of it. As you know, imitations seldom are equal in quality to the genuine, and if a merchant wants a fan scale of this type, he had better get a Toledo. If a merchant has one, surely it would be better to trade it out and get a Toledo.

In addition to the fact that the courts granted us an injunction against the makers of this scale, there are a few little details, in which, like all imitations, it is not equal to the original. For example, two poises on the same beam is not considered good scale construction and yet this is one of the defects on this scale that is never found on a Toledo. And, although similar in construction and principle to the Toledo fan type scale, this scale is not so finely or so carefully made, and thus most of the benefits, due to the Toledo principle, are lost.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

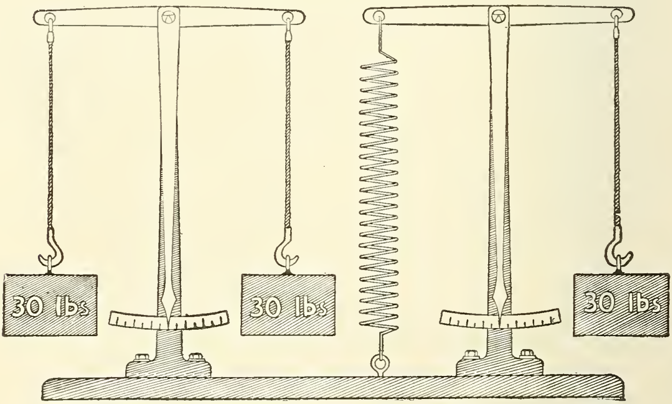
Engineering Department,
TOLEDO SCALE COMPANY.

SPRING SCALES

A spring to counterbalance the load, is a spring whether we find it in one make of scale or another. Therefore, we shall treat the whole subject of springs in scales before we proceed to the discussion of the different makes of spring scales. There is no advantage in repeating the same matter over and over again under the head of each separate make of spring scale.

An entire volume might easily be written on the subject of the unreliability of springs when used to counterbalance the load in any sort of a weighing device. Look at the illustration below. It will appeal even to the un-

Why spring scales are wrong



Which will remain the same week after week?

technical mind. Anyone knows that the spring will stretch, but that weight balanced against weight will always remain constant.

Good encyclopaedias refer to the fact that springs are not reliable where precision is required, for springs vary with the temperature, and also with continued use. In other words a spring in a scale is never exactly the same as it was on the day that spring was adjusted and sent out.

But in addition to that variation in a spring which takes place as it gets older, springs vary constantly from day to day owing to changes in temperature. It is true that in some cases the variations in spring scales are slight, but we take the position that a scale should be as nearly accurate as it is possible for human ingenuity to make it, and that no merchant can afford to place upon his counter a weighing device in which there are even slight variations. Consider that only a half ounce of overweight on a pound transaction robs the average merchant of over 30% of his profit on that transaction, and you can understand why we are so firmly convinced that springs should not be put into a scale for counterbalancing the load.

Then, the fact that the present high prices and the limited space in small kitchens and kitchenettes that are now so common, result in a great many more half and quarter pound drafts being made today than ever before. Well, if a half ounce on a pound transaction robs a merchant of over 30% of his profit, it robs him of over 60% on a half pound transaction and turns the transaction into a serious loss when he gives a half ounce overweight on a quarter pound transaction.

Inventors have for years been trying to perfect a lock that could be operated without the use of a spring, because they realize the unreliability of springs; also because they realize their tendency to rust and corrode and change their tension and cause trouble in numerous other ways.

The sidereal clocks in the observatories are never operated by springs, but are always pendulum operated on the same standard, everlasting gravity principle as the Toledo Scale.

Now comes an amusing feature of the controversy that has for a long time raged between us and the makers of spring scales. When the eternally correct Toledo gravity principle was first put into an automatic computing scale, the makers of spring scales did not attempt to apologize for their springs. They approached the merchant as if a spring in a scale to counterbalance the load was an absolutely correct construction and accepted as correct.

But presently when we began to point out the fact that springs should not be used in a scale, the manufacturers began to make excuses for their springs; they began to say that springs were all right because they were tested and found to be all right. And then they said that the variation was so trifling that it did not amount to anything. It went along in this way for quite a while and then they made an astounding admission. One manufacturer came out with a circular entitled "A Great Discovery," in which he informed the users of scales that spring scales were inaccurate, that everybody knew that spring scales were inaccurate and that therefore they had perfected a device to correct this inaccuracy. This was rather good when you consider that for years they had been claiming that the inaccuracy of spring scales was so trifling that it did not matter.

Well, things went along this way for a while, until we pointed out that the thermostat, which was the device supposed to correct the error of the springs, was not behaving in the manner intended by its makers. We knew from the start that it would not.

Apparently the makers of spring scales and the thermostat realized about the same time that the thermostat was a selling scheme because hand adjustment devices were retained on their scales. So it was still possible, by means of this hand-adjustment device to bring the scale to a false zero, which looked all right to the customer, although, of course, there were serious inaccuracies at all points from zero to capacity.

All of this looks rather ridiculous when the facts are brought together in this close relationship, and we see how the makers of spring scales have reversed themselves on the subject of springs. So it all sums up to this—that the springs have failed, that the hand-regulating device has failed, that the thermostat has failed, and that there doesn't seem to be any other sort of device that can be piled onto a spring scale to correct something that is fundamentally and eternally wrong. Why fuss with something that is fundamentally wrong, when scales built on the correct Toledo gravity principle are so easy to obtain?

Every merchant knows that the public is suspicious of spring scales; every merchant who has given the matter a moment's thought realizes the value of the Toledo slogan "No Springs—Honest Weight." The

If Spring Scales are all right, why do we hear so many contradictory excuses for them?

value of this slogan is partly due to the fact that the public suspects a spring scale of being inaccurate. No merchant would use a spring scale if it bore plainly the sign "This is a Spring Scale." The springs are something to conceal, or at least the fact that they are used to counterbalance the load. This brings us to another amusing feature.

Some spring scale salesmen (we can hardly believe that the manufacturers have authorized this) have gone so far as to tell merchants that the springs in their scales were not used to counterbalance the load, but were merely for the purpose of pulling the chart back to zero. Well, this is so ridiculous that it hardly needs mentioning, were it not for the fact that there are a great many people who do not know anything about the mechanism of a scale and who might be temporarily deceived by such a statement. Of course, a moment's thought shows you that there would have to be an a awful lot of friction in a scale to make it necessary for the addition of two strong springs to bring the chart back to zero every time a weighing was made. Any merchant could prove, to his own satisfaction, that springs are used to counterbalance the load by unhooking the connection between the nose of the main lever and the springs whether it be made through a compensating bar or in any other way. And, of course, the fact that spring scale salesmen go to such lengths to apologize for springs, proves that they know them to be wrong.

In connection with the whole subject of springs, it will perhaps be well for us to speak of the claim that has been made by some manufacturers of spring scales and by some badly-informed scale salesmen, that our steel band connecting the main lever and the pendulum of the Toledo Scale is just as unreliable and just as subject to variations due to lapse of time and change in temperature as a spring. To anyone who has even a superficial understanding of the laws of physics, this contention will, of course, be extremely ridiculous. But since many of us have not knowledge of this sort, it may sometimes be necessary to demonstrate the absurdities of this argument.

To begin with, the steel band in our cylinder scale will stand a 200 pound pull without breaking or stretching to a degree that would in the slightest affect the accuracy of the scale. Now note this particularly, that although the band will stand a tension of 200 pounds, in actual use with weight on the platter to the capacity of the scale, there is only about a 5 pound tension on this band. Therefore there is no possibility of its stretching.

The steel band in a Toledo Scale does not in any way perform the function of a weighing spring. The function it does perform, is that of a belt to convey movement from one moving part to another. Any other flexible material made in the form of a band or thin belt would answer the purpose just as well, but would not remain permanent, hence the steel band.

Now as to the possibility of this band expanding or contracting, due to heat and cold, to a sufficient degree to affect the accuracy of the scale, please note the following: this band is about 4½ inches in length. Hence the natural expansion due to heat and cold would be so infinitesimal that it could not possibly affect the accuracy of the scale. But the claim made by the makers of spring scales that this band does expand and contract is just a further confession of the weakness of a spring. Each of the springs in a scale contains from 8 to 12 feet of wire, or say an average of 10, making a total of 20 feet in the two springs. Now 20 feet is just about 53 times as long as the 4½ inches of our steel band. Therefore, if our steel band did expand and contract to a sufficient degree to affect the accuracy of the scale, a spring scale would have an error 53 times as great. In other words, the springs have just 53 times as much variation as the steel band.

Do we need any other argument against springs? It seems as if every defense that was brought up for them merely resulted in further proof of their utter unfitness in an instrument of precision.

Perhaps one of the strongest arguments to be brought against springs in scales would be that in many European countries spring scales are forbidden by law in retail establishments. It is pretty generally conceded that more attention has been paid in Europe to the safeguarding of the public than in this country. But there is a strong tendency in this country to be more particular in matters of this sort. The public is becoming gradually educated, the cost of living is sharpening their wits on subjects of this sort and spring scales are almost certain to become more and more unpopular.

HANGING SPRING BALANCE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the ordinary Hanging Spring balance, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

The chief objection to these scales is that they are spring-operated, the spring counterbalancing the load. This applies, of course, whether it is a computing scale or merely a weighing device. Some of these hanging spring scales have a computing chart and some of them merely indicate weight. But in either case the fact that they are spring scales is one of the biggest objections to them.

In addition to the fact that these hanging scales are spring scales, we should consider that they do not guarantee honest weights or values. Many of them do not compute, compeling the merchant to make vexatious calculations which constantly result in costly errors. The scale is out of date and puts the merchant down as a back number, makes customers suspicious and drives away trade.

It very likely loses for the merchant in cash every month an amount equal to the cost of good weighing equipment.

One of the causes of extreme inaccuracy in this type of scale is the fact that it swings back and forth and prevents the indicating hand from coming to rest. The merchant, therefore has to guess at the weight, making this scale truly a guessing machine.

Hanging Spring Balance Scale with Computing Chart. Those of the ordinary type are similar in general appearance but have a clock face dial.

There are two reading lines in many scales of this type, so that the short man sees a different weight from the weight that the scale indicates to the tall man. Where the scale is merely a weighing scale and hasn't the computing feature, the indicating hand is, as a rule, too far from the dial so that the merchant has to guess at the indication and the customer has to guess whether or not she got what she paid for. Most of them have very wide graduations so that it is very easy to give nearly a full ounce overweight without realizing what the merchant is throwing away.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects that it is only just to point out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

DETROIT AUTOMATIC CYLINDER SPRING SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Detroit Automatic Computing Cylinder Spring Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

One of the chief objections to the Detroit Automatic 30 pound scale is that it is a spring weighing device. There are two springs, both of which are hidden inside the column directly under the center of the chart cylinder. Look on page 52 for the detailed objections to the use of springs for counterbalancing the load in any sort of a weighing device requiring accuracy. In addition to the fact that the Detroit automatic cylinder scale Model 120 is a spring scale, there are several other serious defects which it is proper that the prospective purchaser should understand.

The lever fulcrum pivots are exposed to dirt and dust. They are apt soon to become fouled and render the scale exceedingly sluggish and far from accurate. There are no positive means for holding the pivots in the proper place. The result of this is that if the pivots become loosened, they will throw the whole platform out of balance, resulting in the most serious inaccuracies.

There is no shock absorbing device between the lever and rack to protect the rack and pinion from injury due to sudden jars or shocks when a heavy load is suddenly placed upon the platter. The consequence of this is that the rack and pinion wear very fast, resulting in inaccuracies. And such a strain is put upon the chart shaft and on the connections between it and the chart that the whole indicating mechanism is apt to be thrown very badly out of the correct position, resulting in serious inaccuracies in weighing.

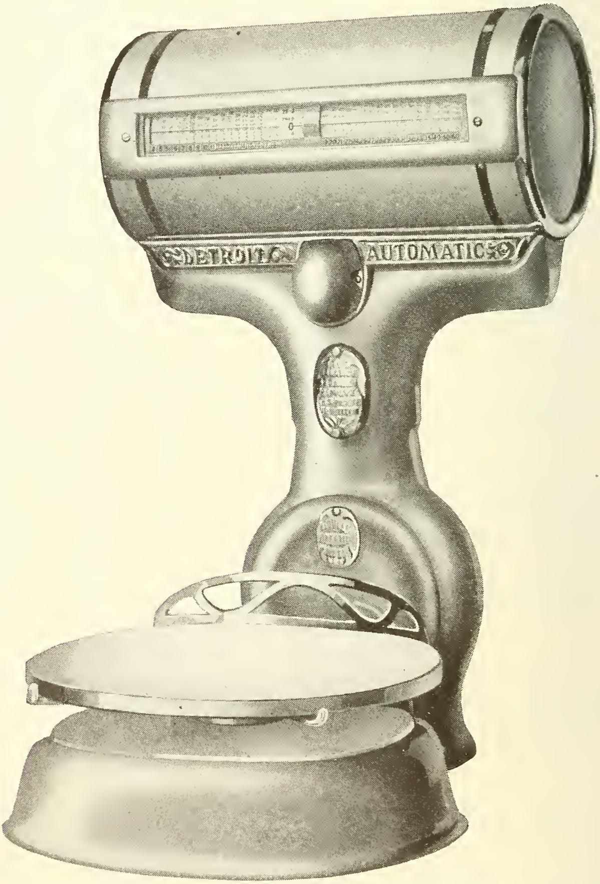
From a mechanical standpoint the workmanship of the scale does not seem thorough or of the first class.

The method of fastening the base to the column is not in our opinion the best and is apt to cause the connection between the main lever and the indicating mechanism to get out of place and result in inaccuracies.

The hand-operated device for bringing the chart to zero is difficult to get at. It is on the side of the scale opposite the merchant and in order to get to it, it is necessary to remove a plate.

The connection between the two rack rods is frail in appearance and gives the impression that it might easily be warped or bent, causing inaccuracies in weighing.

There is a funnel-shaped top to the dash-pot which collects dirt and dust, fouls the dash-pot and will ultimately result in serious inaccuracies in weighing.



20-Pound Capacity Detroit Automatic Spring Scale

The leveling screws in this scale because of their location under the base are difficult to operate.

A circular issued by the Standard Computing Scale Company, Detroit, announces that the Detroit Automatic Spring Computing Scale shown on page 62 is an infringement of their Letters Patent No. 40,157 and No. 1,001,202; that they have started suit against twelve purchasers of this scale and the manufacturers. Of course, we cannot tell how this suit will be decided, but for the present at least, prospective purchasers of this scale should be advised of the fact that there is litigation over it.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

STANDARD COMPUTING SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained below, of the Standard Computing Spring Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration.

But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

One of the principal objections to the Standard is that it is a spring weighing device. There are two springs, both in the center column.

Look on page 52 for the detailed objections to the use of springs for counterbalancing the load in any sort of a weighing device requiring accuracy.

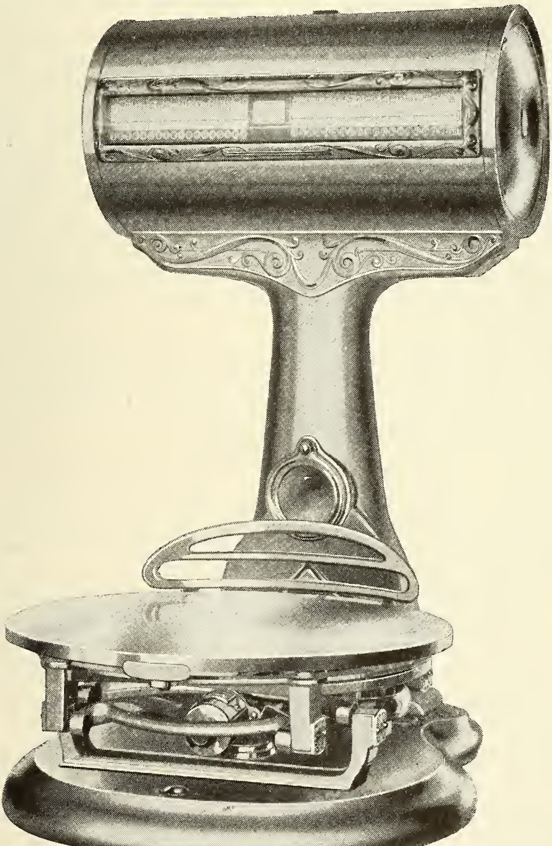
The earlier Standard Scales were equipped with a hand-operated knob below the cylinder to adjust the chart to the zero position. This altered the length and elasticity of the weighing springs. On later types this knob was equipped with a dial upon which were figures and graduations. The dial was to be turned by hand to an indication corresponding with the temperature as indicated by a thermometer.

Standard Computing Spring Scale

This dial adjustment did not, however, assure the correct weighing of the scale from zero to its full capacity.

On still later types, the temperature dial was located below the platter on the main weighing lever.

On later types of the Standard scale the temperature dial was located below the platter on the main weighing lever. This makes three different hand-operated devices which have been employed in efforts to overcome the in-



Another Type of Standard Computing Spring Scale

herent defect in the springs. Every such device must be watched and an effort made to adjust it by hand to correspond with the temperature, which effort is nearly always futile, as no one but an expert could ordinarily adjust such a scale so it would weigh correctly at all points from zero to capacity. In many of these Standard Scales observed by us in different stores, the indication on the adjustment dial did not correspond with the temperature of the room, showing that these adjustments are not taken seriously by the merchant.

Now consider those disadvantages in the Standard that are in addition to its being a spring weighing device.

The weight indication exhibited on the customer's side and the weight indication on the merchant's side are on separate charts. In many instances these charts have changed position with relation to each other, causing a difference between the weight indication on the merchant's side and the weight indication on the customer's side, resulting, of course, in wrong indication of values and serious misunderstandings between merchant and customer.

Older types are equipped with brass scrolls, the finish of which soon wears off. They also accumulate dirt and verdigris, giving the scale an unpleasing appearance and producing an unsanitary condition.

Another defect of the Standard is that scales must be set level to weigh correctly and that these scales of the older type are not provided with means for determining when they are level on the counter. This has been provided for on later types. Few counters are in perfect level and many users, not knowing this and thinking that the scale does not stand at zero because of the temperature, set the scale at zero by means of the temperature dial when this is not the trouble at all and the scale merely needs to be set level. This causes additional inaccuracies which increase as weight is added.

In the past, Standard scales were equipped with swivel bases. Many of them now in use must still have these bases. In view of this fact, a letter sent out by the Standard Computing Scale Company, Ltd., of Detroit, Michigan, is of interest. This is the letter:

**"SWIVEL BASE SCALES
DO NOT SELL THEM**

"Ours have a better swivel than any other scale, but when complaints are investigated, it is always found 'the scale has been moved and the merchant did not level it.' In time they begin to rock and become unsatisfactory.

"Explain this to the merchant and he will not want them.

"Two years ago 25 per cent of our sales were swivel base scales. Now the percentage is less than 5 per cent.

"The 20th Century with new base is the best for the merchant and does not cause trouble.

THE STANDARD COMPUTING SCALE COMPANY, Ltd."

Note they instruct their salesmen not to sell swivel base scales. We have long taken the position that the swivel base was unsatisfactory even when most carefully made.

Merchants who are using or contemplate purchasing spring scales equipped with swivel base, whether Standard scales or of some other manufacture, should be informed of the experience of the Standard Computing Scale Company, Ltd. If the manufacturers themselves admit that spring scales with swivel bases, become unsatisfactory and consequently inaccurate, it is very certain that the situation is quite grave.

There are thirteen bearings in the Standard Scale, nine of which are load-supporting. This is about twice as many as are found in Toledo Scales. The consequence of unnecessary bearings is, of course, reduced sensitiveness, meaning greater inaccuracies in weighing.

In the earlier types there is no positive means for fastening the glass platter to the scale, consequently on these scales there is continuous danger of the platter getting knocked off and broken, causing a delay and expense in replacement.

Compare the beautiful Toledo scale with electric light equipment with the Standard electric scale with its make-shift arrangement. It seems very crude and incomplete. The electric light is not automatic, but must be turned on or off when the merchant desires to use it.

Consider some of the claims made for the Standard and the perfectly obvious replies.

CLAIMS MADE BY THE STANDARD SCALE COMPANY FOR THEIR 20TH CENTURY SCALE

1. "It is the most artistic looking scale ever placed on a merchant's counter."

The real art in a scale, if the term can be applied to a scale at all, relates to its utility, permanence and accuracy. These are not evident in the Standard's general design. It is all out of proportion, and is too light and frail for a machine designed to do and continue to do accurate weighing. Even though it were the most artistic looking scale, what profit or satisfaction is there to be derived if the real qualities which stand for art in a scale—utility, permanence and accuracy—are lacking? It cannot be said a scale is permanent or accurate that has a regulator which requires constant manipulation to bolster up inherent defects in the most prominent feature of its principle of construction—the springs. Can this be called artistic, or does it lend value to the misleading words "the most artistic looking scale"?

2. "The production of this scale costs more than any other."

If this were true, would it necessarily add value to a scale? Isn't it true that it could be made of pure gold and yet be worthless as an accurate weighing machine, which is the sole purpose of a scale? If it does cost more, might it not be due to mechanical inefficiency in the factory where the scale is built? There are no other reasons why the scale should cost as much as the Toledo.

3. "All metal trimming parts in solid bronze and all bearings are polished agates. Spring construction full nickel plated."

Ornamented trimmings do not add value to a scale. On the contrary, they are difficult to keep clean, soon corrode, and become unsightly and unsanitary. Plating a spring does not add value to it when it is used as the most delicate part of the weighing mechanism of the scale. To nickel plate a steel spring it is necessary first to apply a coat of copper and then the nickel. The nature of copper and nickel is similar to that of lead—in other words, there is little resilience in either. Therefore, to apply a coat of each of those to steel has a tendency to and does interfere with the resilience of a spring such as is used in Standard Scales.

4. "Glass platform clean and sanitary."

The Toledo also uses glass of the finest quality obtainable.

5. "Our patent weighing platform support insures durability and accuracy. No heavy lead counterpoise used."

The Toledo platform is the best and simplest; other scale companies from time to time have referred to our counterpoise as an objection, but scale engineers are the only ones competent to judge on this matter and scale engineers know that the Toledo is the best. If any other lever system were better we could and would make it.

6. "The value and weight figures are largely magnified so the reading of them is made easy."

This claim has no significance, as the advantage they claim is due entirely to the magnifying glass, which they buy in the open market. It is evident that everyone could buy and use the same, if they chose to. There is one superiority the Toledo can claim. For the Toledo cylinder scale there are over forty (40) different charts of different capacities, different price ranges, different styles and sizes of figures. The Standard, we are informed, has less than one-tenth of that number.

7. "Vibration perfectly regulated by our patented polar oil pump, which is not affected by cold or heat."

The Toledo was the first to perfect and use this principle for regulating the vibration of a scale. The design of the Toledo damping device is far superior. The points of superiority claimed by the Standard merely reflect credit on the Toledo, inasmuch as the Toledo has used the principle much longer and developed it to a much higher state of perfection than the Standard. Note the funnel-shaped top or cover of the Standard polar oil pump. It is a perfect receptacle for dirt.

8. "No other cylinder scale can compare with ours in weighing and computing capacity or in weighing and computing prices per pound."

The greatest capacity of charts of Standard Scales ranges from 20-30 pounds, with a price range of from

4-75 cents. Capacity of Toledo Cylinder Scale charts ranges from 10-50 pounds, with various price ranges to as high as $1.00.

9. "Everything that is good or necessary in a computing scale is used in the 20th Century Scale."

Two springs are necessary in a Standard Scale but are neither good nor necessary in other computing scales.

It is also necessary for the Standard Scale's electric lighting feature to be in constant contact and always consuming power, otherwise it is necessary to turn the current on and off by hand every time the scale is used. Is this a necessary or good feature? The Toledo Scale is automatically lighted every time a commodity is placed on the platform, and only remains lighted as long as the commodity is on the platform.

Does the so-called "regulator" on a Standard Scale actually regulate? It is claimed for the Standard Scale regulator that if set to register with the thermometer or temperature in the room the scale will register at zero. Isn't it a fact that two Standard Scales sitting side by side in the same room are often known to have the regulator in one instance set at 30° while in the other it is set at 80°, with the temperature in the room perhaps 70° and both scales at zero? This, we believe, fully justifies the attitude of the courts of the State and City of New York that this device, as designed, will facilitate the perpetration of a fraud.

It is important to understand that Standard Computing Scales up to a very short time ago were not permitted to be used in New York State or in the City of Cincinnati.

Recently the Standard people equipped their scale with a thermostat or automatic compensating device, which brings the scale within the requirements of the law and permits it to be used in New York state. This does not, however, necessarily render the scale reliable or accurate.

If a Standard scale offered outside of New York State or outside of the City of Cincinnati, is not equipped with an automatic compensating device, ask the Standard salesman why he does not offer his latest scale.

10. "The spring construction guaranteed for ten years."

These springs which the Standard Scale Company guarantees should actually cost about 6 cents apiece. Do they really guarantee the scales in which these springs are used to weigh accurately without constant re-adjustment? They merely guarantee that the springs will be as good at the end of ten years as they were when the scale was first bought, and no one can tell how poor they were then.

11. "It is the best earning fixture in a store."

If properly constructed and operated, a computing scale is the best earning fixture in a store. But a spring scale needing constant manipulation of the regulator to enable it to approach accuracy and having many bearings liable to increase friction is much less likely to give honest weight and value than the Toledo Scale.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.
TOLEDO SCALE COMPANY.

DAYTON No. 61 TYPE SCALE

Toledo, Ohio, May 1, 1918.

Note particularly the objections to the Dayton 61 type scale, because many merchants, desiring a scale that will hang over the counter leaving all counter space free, have bought this scale without understanding what they were sacrificing for that small advantage.

The defects, as explained, of the Dayton No. 61 type computing spring scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

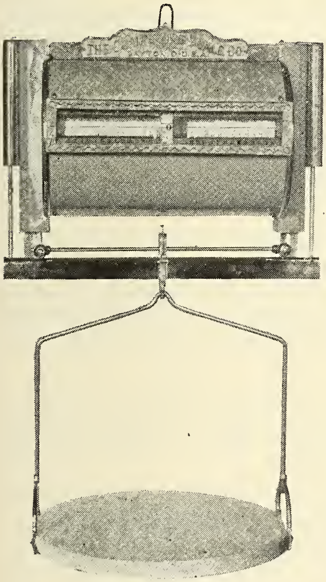
It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

One of the principal defects of the Dayton No. 61 is that it is a spring weighing device. The springs are hidden from view but can be seen by taking off the metal covers at each end of the chart housing.

Look on page 52 for the detailed objections to the use of springs for counterbalancing the load in any sort of a weighing device requiring accuracy.



Dayton No. 61

The makers of this scale in a circular entitled "The Science of Scale Building," make the following fatal admission and false claim: "This illustration shows the refrigerator test of our patented and exclusive thermostatic device which regulates the springs and compensates for any variance in their contraction and expansion in hot and cold weather."

This is a false claim because the thermostat does not overcome the variations due to the contraction and expansion of springs. It is quite useless for us to waste a lot of space in affirming this. All we can say is that wherever you have an opportunity to make the test, put any spring scale equipped with a thermostat in an oven and test it, and then put it in an ice box and test it. Then you will have proved for yourself that the thermostat has failed and failed completely.

But to return to those objections to the Dayton No. 61 that we must consider in addition to the objection that it is a spring operated weighing device.

The crude cylinder shaft bearings in many scales of this type cause excessive friction, resulting in inaccuracies in weighing. Some of these shaft bearings are only holes bored in brass plates in which the cylinder chart shaft revolves.

To control the vibration of the chart, the scale is equipped with a damping device consisting of two metal cylinders in which metal plungers operate. The means for resistance is air instead of oil, and the rubbing of the plungers on the sides of the dry tubes produces excessive friction and causes further inaccuracies in weighing. The action of these close-fitting plungers also sucks dirt and dust into the tubes, causing them to become dirty and corroded, creating still more friction. The long sleeve bearings where the racks are connected to what is called the equalizing bar, being exposed, become dirty and corroded, producing more friction in the action of the rack and pinion.

The use of two racks and two pinions to revolve the chart is entirely unnecessary and, in our opinion, wrong in principle. And it must be plain even to the lay mind that the additional and unnecessary number of working parts increases friction.

Note these four serious causes of unnecessary friction. The crude cylinder shaft bearings, the two metal cylinders or plungers which are used to control the vibration of the chart, the long sleeve bearings and the use of two racks and two pinions to revolve the chart, instead of one of each. Any one of these would cause serious inaccuracies, but when combined they multiply the error many times.

Now here is another objection piled on top of those. As the great majority of weighings are of small drafts, the plunger in the damping device ordinarily moves only a limited distance. This allows dirt and corrosion to accumulate on the unused surface of the cylinders, so that when a weighing in excess of the average draft is made, a still greater amount of friction is produced. In other words, in these scales friction is piled on top of friction until it would seem that any hope of even approximate accuracy must vanish.

As this scale has only 24 prices per pound, it is unsatisfactory in places where any considerable trade and where any large variation of prices exist.

The old chart with a 24 pound capacity contains 4,608 money value computations, of which 3,072 are incorrectly placed. This, in many cases, results in loss to the customers. Owing to our activity in exposing this false chart it is no longer being put into this scale as far as we know, but many of these scales with these crooked charts must still be in use.

In these scales, where the merchant's indicator for values consists of a red line engraved on the glass, the line is so far from the chart as to make accurate reading of the values almost impossible. In other scales of this type no reading line is fixed, leaving the user to read the value figure most acceptable to him, accurate reading being absolutely impossible.

The weight indicator on the customer's side being broad and far from the chart makes accurate reading of the weights by customer almost impossible.

On the merchant's side of the scale, the indicator for weight and the indicators for values are three separate devices, often not in perfect alignment, resulting in inaccurate indication of weights and values.

A hanging scale constructed as is this No. 61, must inevitably swing from side to side or back and forth in the operation of weighing, thus making the indicating chart tremble and causing extreme difficulty in accurate reading of weight and money values.

The springs in these scales, as in most spring scales, are under considerable tension even when the scales are set at zero. This tension or continual strain upon the springs ranges from 6 to 10 pounds, according to the particular type of scale.

The general design and cheap appearance of this scale, its springs together with the several causes of excessive friction, its false charts and chiefly the many court decisions against it and scathing public denunciations of it, make its use by any merchant not only extremely unwise, but almost prohibitive.

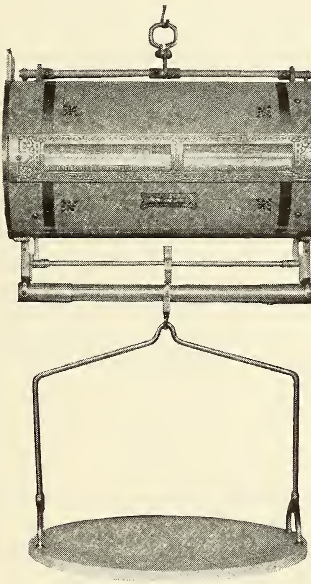
Further proof of the undesirability of Dayton Moneyweight barrel-shaped spring balance computing scales is that thousands of the most successful merchants have discarded them and substituted Toledos. Why have they done this? Why have the cleverest merchants gone to an enormous expense of this sort? There is a powerful reason why experienced business men act in this manner.

Careful study by the salesmen of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

DAYTON No. 115 TYPE SCALE



Toledo, Ohio, May 1, 1918.

Note particularly the defects of the Dayton No. 115 type scale. Many merchants desiring a scale that will hang over the counter, leaving all counter space free, have bought this scale or the Dayton No. 61, (see page 73), without understanding what they were sacrificing for the small advantage of gaining a little counter space.

The defects, as explained below, of the Dayton No. 115 type computing spring scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company, that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department,

TOLEDO SCALE COMPANY.

One of the principal defects of the Dayton No. 115 is that it is a spring weighing device. The springs are hidden from view, but can be seen by taking off the metal covers at each end of the chart housing.

Look on page 52 for detailed objections to the use of springs for counterbalancing the load in any sort of a weighing device requiring accuracy.

The makers of this scale, in a circular entitled "The Science of Scale Building," make the following fatal admission and false claim: "This illustration shows the refrigerator test of our patented and exclusive thermostatic device which regulates the springs and compensates for any variance in their contraction and expansion in hot and cold weather."

This is a false claim, because the thermostat does not overcome the variations due to the contraction and expansion of springs. It is quite useless for us to waste a lot of space in affirming this. All we can say is that wherever you have an opportunity to make the test, put any spring scale equipped with a thermostat, in an oven and test it, and then put it in an ice box and test it. Then you will have proved for yourself that the thermostat has failed and failed completely.

But to return to those defects of the Dayton No. 115 that we must consider in addition to the fact that it is a spring-operated weighing device.

The crude cylinder shaft bearings in many scales of this type cause excessive friction, resulting in inaccuracies in weighing. Some of these shaft bearings are only holes bored in brass plates in which the cylinder chart shaft revolves.

To control the vibration of the chart, the scale is equipped with a damping device, consisting of two metal cylinders in which metal plungers operate. The means for resistance is air instead of oil, and the rubbing of the plungers on the sides of the dry tubes, produces excessive friction and causes further inaccuracies in weighing. The action of these close-fitting plungers also sucks dirt and dust into the tubes, causing them to become dirty and corroded, creating still more friction. In one of these scales recently examined, we found that the crude counterbalance used to hold the rack in mesh with the pinion, scraped against the outer wall of the dash pot whenever a weighing was done. From the condition of the dash pot wall and this lead counterbalance, it was evident that this had been going on for a very long time, perhaps ever since the scale was made. Just think of the friction this caused and the amount of overweight the user of that scale must have given out during the time he had it in his store.

The use of two racks and two pinions to revolve the chart, is entirely unnecessary and, in our opinion, wrong in principle. And it must be plain even to the lay mind that the additional and unnecessary number of working parts increases friction.

Note these serious causes of unnecessary friction. The crude cylinder shaft bearings, the two metal cylinders or plungers which are used to control the vibration of the chart and the use of two racks and two pinions to revolve the chart, instead of one of each. Any one of these would cause serious inaccuracies, but when combinded, they multiply the error many times.

Now here is another objection piled on top of these. As the great majority of weighings are of small drafts, the plunger in the damping device ordinarily moves only a limited distance. This allows dirt and corrosion to accumulate on the unused surface of the cylinders, so that when a weighing in excess of the average draft is made, a still greater amount of friction is produced. In other words, in these scales friction is piled on top of friction until it would seem that any hope of even approximate accuracy must vanish.

In these scales, where the merchant's indicator for values consists of a piece of red wire strung along the inside of the glass, the line is so far from the chart as to make accurate reading of the values very difficult. In fact, a short man would have a very different idea of the reading from the idea that a tall man would have concerning it.

The weight indicator on the customer's side being broad and far from the chart, makes accurate reading of the weights by a customer almost impossible.

A hanging scale constructed as is this No. 115, must inevitably swing from side to side, or back and forth in the operation of weighing, thus making the indicating chart tremble and causing extreme difficulty in accurate reading of weight any money values.

The springs in these scales, as in most spring scales, are under considerable tension even when the scales are set at zero. This tension or continual strain upon the springs, ranges from 6 to 10 pounds, according to the particular type of scale.

In addition to there being one more rack and pinion than is necessary, these racks and pinions appear to be of exceedingly crude construction. The contact between the rack and pinion is provided for in an exceedingly uncertain way, which may cause excessive friction and very inaccurate readings.

The general design and cheap appearance of this scale, its springs, together with the several causes of excessive friction, the many court decisions against the Dayton No. 61, which is very similar to this scale and the scathing public denunciations of the No. 61, make the use of this scale by any merchant not only extremely unwise, but almost prohibitive.

Further proof of the undesirability of Dayton Moneyweight barrel-shaped spring balance computing scales is that thousands of the most successful merchants have discarded them and substituted Toledos. Why have they done this? Why have the cleverest merchants gone to an enormous expense of this sort? There is a powerful reason why experienced business men act in this manner.

Careful study by the salesmen of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department,
TOLEDO SCALE COMPANY.

DAYTON Nos. 63 and 95

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Dayton Nos. 63 and 95 type scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

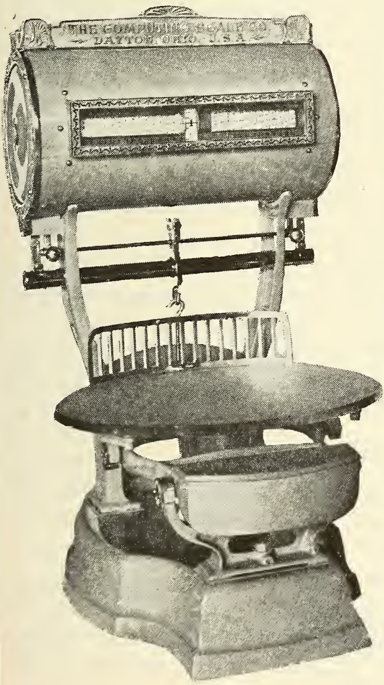
One of the principal objections to the Dayton Nos. 63 and 95 is that it is a spring weighing device. The springs are hidden from view, but can be seen by taking off the metal covers at each end of the chart casing.

Look on page 52 for the detailed objections to the use of springs for counterbalancing the load in any sort of an accurate weighing device.

The makers of the Dayton Nos. 63 and 95 Types apparently realizing quite fully the inherent inaccuracy of springs, have made an effort to overcome this defect by equipping the scales with a mechanical device known as the thermostat. But this device has been found a failure. It does not compensate for the change in the springs due both to changes in temperature and lapse of time, and the consequence is that constant hand-regulating of such scales to a correct zero position is necessary. But unfortunately when so hand-regulated to a correct zero position they are almost certain to weigh inaccurately at many points between zero and full capacity.

In addition to the serious defect of its being spring operated, the Dayton No. 63 or 95 Type has the following objections:

All scales must be set level to weigh correctly, and these scales are not provided with proper means for adjusting or determining when they are level on the counter.



Dayton No. 95.
The No. 63 is similar in construction but has a slightly different base and chart housing.

The chart shaft is mounted in ball bearings. This might be an excellent thing were it not for the fact that this type of bearing consists of six steel balls mounted in a hardened steel case. Due to the manner of construction of the device (the case being of one piece and having no adjustment), it cannot be ground or polished after hardening, consequently a high degree of accuracy is impossible, and much of the benefit that might ordinarily be obtained by the use of ball bearings is lost.

The next cause of unnecessary friction is the long sleeve bearings where the racks are connected to what is called the equalizing bar. Not only is this too long, but being exposed it is liable to become dirty and corroded, producing much friction and lost motion in the action of the rack and pinion.

Another serious objection is the use of two racks and two pinions to revolve the chart. This, in our opinion, is unnecessary and it is certainly productive of additional friction.

Just note how friction seems to be compounded with friction and piled on top of friction, so that the error resulting from any of this unnecessary friction is multiplied as many times as the friction is multiplied.

To control the vibration of the chart, a dash pot containing glycerine is mounted in the base of the scale. Working in this dash pot is an adjustable plunger connected to the lever of the scale. Many of these scales have no protector to prevent manipulation of the dash pot plunger from the customer's side. The result of this is that the accidental or intentional adjustment of the plunger by some meddlesome person might permit the glycerine to be pumped out of the dash pot. This would not only cause an unsanitary condition but would make the regulation of the chart impossible.

Another defect is that the construction of the plunger is such that the working parts, or many of them become loosened making regulation of the vibration impossible. The glycerine used in most of these dash pots becomes thickened in cold weather to such an extent as frequently to cause inaccuracies in weighing. The opening in the dash pot is not sufficiently protected to prevent dirt and foreign substances from getting into the dash pot and mixing with the sticky glycerine. All of this makes frequent cleaning and adjusting necessary and greatly increases the danger of inaccuracies in weighing.

The upright rod which is fastened to the casting under the platter, and which passes through the hole in the base, has no protecting device to prevent articles from coming in contact with the rod, thus causing friction and inaccuracy in weighing.

There is no positive means for fastening the glass platter to the scale. It merely rests upon it, consequently it is very liable to get knocked off and broken causing an expense and delay in replacement and putting the scale out of use while replacement is being made.

As this scale has only 24 prices per pound it is unsatisfactory in most places where commodities at a wide range of prices are sold.

The old chart of 24 pounds capacity contains 4,608 money values and computations, of which, 3,072 are incorrectly placed, which in many cases results in loss to the customer. Owing to our activity in exposing this false chart, it is no longer being put into the scale as far as we know, but it seems certain that many of these scales with these crooked charts are still in use.

Remember, that the fact of this chart being false has been established in court and is no longer a matter of mere opinion.

In these scales where the merchant's indicator for values consists of a red line engraved on the glass, the line is so far from the chart as to make accurate reading of the values almost impossible.

In others no reading line was fixed, leaving the user to read the value figure most acceptable to him, accurate reading being impossible.

The weight indicator to the customer being broad and so far from the chart makes accurate reading of weights by customer almost impossible.

On the merchant's side of the scale the indicator for weight and the indicators for value are three separate devices, often not in perfect alignment, resulting in inaccurate indication of weights and values.

The springs in this scale, as in most spring scales, are under considerable tension even when the scales are set at zero. This tension or continual strain upon the springs ranges from 6 to 10 pounds, according to the particular type of scale, and results in still greater inaccuracy.

The general design and cheap appearance of this scale, together with its springs, its false charts, the court decisions against it and the scathing public denunciation of it, make its use by any merchant extremely unwise if not prohibitive.

Further proof of the undesirability of Dayton Moneyweight barrel-shaped spring balance computing scales is that thousands of the most successful merchants have discarded them and substituted Toledos. Why have they done this? Why have the cleverest merchants gone to an enormous expense of this sort? There is a powerful reason why experienced business men act in this manner.

Careful study by the salesmen of the mechanism of these scales and talks with those who have used and abolished them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

DAYTON Nos. 144 AND 146 COMPUTING CYLINDER SCALES

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Dayton No. 144 and No. 146 scales, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

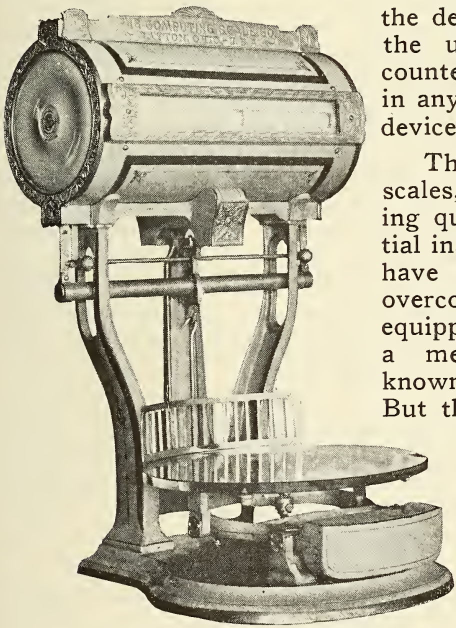
We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

One of the principal objections to the Dayton Nos. 144 and 146 is that they are spring weighing devices. In the 144 the springs may be seen by removing the ends of the chart casing. In the 146 they may be seen through the glass in the ends of the chart casing.



Dayton No. 144

Look on page 52 for the detailed objections to the use of springs for counterbalancing the load in any sort of a weighing device requiring accuracy.

The makers of these scales, apparently realizing quite fully the essential inaccuracy of springs, have made an effort to overcome this defect by equipping the scales with a mechanical device known as the thermostat. But this device has been found a failure. It does not compensate for the change in the springs due both to changes in temperature and lapse of time, and the consequence is that constant hand-regulating of such scales to a correct zero position is necessary. But unfortunately when so hand-regulated to a correct zero position they are almost certain to weigh inaccurately at many points between zero and full capacity.

But to return to those defects of the Dayton No. 144 and No. 146 which are in addition to their being spring-operated weighing devices.

Scales should set level to weigh correctly but many of these scales are not provided with proper means for determining when they are level, on the counter. They have sometimes been equipped with a swivel base which is supported by four leveling screws. Unless the swivel base is perfectly level the scale will not weigh correctly in different positions as it is revolved. To level this base is most difficult. (See page 66 for evidence of what another scale company thinks about swivel bases.)

These scales are equipped with brass scrolls, the finish of which soon wears off. They accumulate dirt and verdigris, giving the scale an unpleasing appearance and producing an unsanitary condition.

The chart shaft is mounted in ball bearings. This might be an excellent thing were it not for the fact that this type of bearing consists of six steel balls mounted in a hardened steel case. Due to the manner of construction of the device (the case being of one piece and having no adjustment) it cannot be ground or polished after hardening, consequently a high degree of accuracy is impossible and much of the benefit that might ordinarily be obtained by the use of ball bearings is lost.

The next cause of unnecessary friction is the long sleeve bearing where the racks are connected to what is called the equalizing bar. Not only is this too long, but being exposed, it is liable to become dirty and corroded, producing much friction and lost motion in the action of the rack and pinion.

Another serious objection is the use of two racks and two pinions to revolve the chart. This, in our opinion, is unnecessary and is certainly productive of additional friction.

Just note how friction seems to be compounded with friction and piled on top of friction, so that the error resulting from this unnecessary friction is multiplied just as many times as the friction is multiplied.

To control the vibration of the chart, a dash pot containing glycerine is mounted in the base. Working in the glycerine dash pot is an adjustable plunger connected to the casting under the platter. To adjust this plunger it is necessary to raise the platter then to replace it to determine if the vibration is correct. This operation must be repeated until the vibration of the chart is satisfactory.

The construction of the plunger is such that the working parts on many of them become loosened making regulation of the vibration impossible. The glycerine used in the dash pot becomes thickened in cold weather to such an extent that it causes inaccuracies in weighing in many cases. The opening in the dash pot is insufficiently protected, permitting dirt and foreign substance to get into the dash pot and mix with the sticky glycerine, making frequent cleaning and adjusting necessary and greatly increasing the danger of inaccuracies in weighing.

The lower ends of the weighing springs are connected to metal plates which extend through the chart housing and connect to the thermostat tube. With the chart at zero position these metal plates project through the casing about 4 inches. As a load is applied to the platter, these metal plates extend lower until 5⅞ inches are exposed. These plates being unprotected, there is great liability of packages coming in contact with them and their movement being interfered with, which would result in inaccuracies in weighing.

In some of these scales, we are advised the thermostat is under the base; the springs are high up in the cylinder casing. Just think how this would render the thermostat inoperative where a scale was resting upon a refrigerator counter. The thermostat might be very cold and the springs quite warm.

If the scale is equipped with electric lights inside the casing, the springs might be very warm and the thermostat at the ordinary temperature of the atmosphere in the store, again rendering it entirely inoperative.

In the swivel base electric scales there is no provision for bottom connection of the electric cord. All such scales must be connected from above. These overhead connections are sometimes unsightly and mar the appearance of the store.

There is no positive means of fastening the glass platter to the scale. It merely rests upon the spider. Consequently the liability of the platter getting knocked off and broken, causing delay and expense in replacement is quite serious.

The springs of this scale are under considerable tension even when the scale is set at zero. This tension of continual strain upon the springs ranges from 6 to 10 pounds, according to the particular type of scale, and of course, results in the springs developing inaccuracies much sooner than they otherwise would.

The illuminated sign space visible to the customer is so small as to be almost useless. Such expressions as "Thank You" and "Call Again" are about the strongest signs that can be placed on such scales. Just contrast with this the famous trade-bringing Toledo slogan "No Springs—Honest Weight."

Between the cylinder casing and the platter there is exposed to view a large flat casting called the check riser, which is attached rigidly to and moves up and down with the casting on which the platter is supported. A large surface of about 9 inches long and 2 inches wide of this check link connecting casting is uncovered and unprotected. This is most dangerous, because if it rubs against anything it will cause friction and force the merchant to give a large excessive weight. There is also danger of a customer accidently placing his hand against this check link connection, producing friction and causing the merchant to give a large excessive weight. It has been said that in some instances dishonest persons have intentionally placed their finger against this check link connection and received thereby large excesses in weight. This is a dangerous feature of the scale and is by itself a sufficient objection to make its use almost prohibitive.

In looking over the objections to this scale it would seem that with the exception of the fatal springs no one of these objections might be sufficiently serious to cause a merchant to decline to purchase. But when you consider the accumulation of little objections, when you think of one objection piled on top of another, until there is quite an alarming number of them, it does not seem possible that any merchant could be so short-sighted as to purchase this type of scale.

Further proof of the undesirability of Dayton Moneyweight barrel-shaped spring balance computing scales is that thousands of the most successful merchants have discarded them and substituted Toledos. Why have they done this? Why have the cleverest merchants gone to an enormous expense of this sort? There is a powerful reason why experienced business men act in this manner.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.
TOLEDO SCALE COMPANY.

DAYTON Nos. 344 AND 346 COMPUTING CYLINDER SCALES

Toledo, Ohio, May 1, 1918.

The defects of the Dayton No. 344 and No. 346 scales, as explained, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

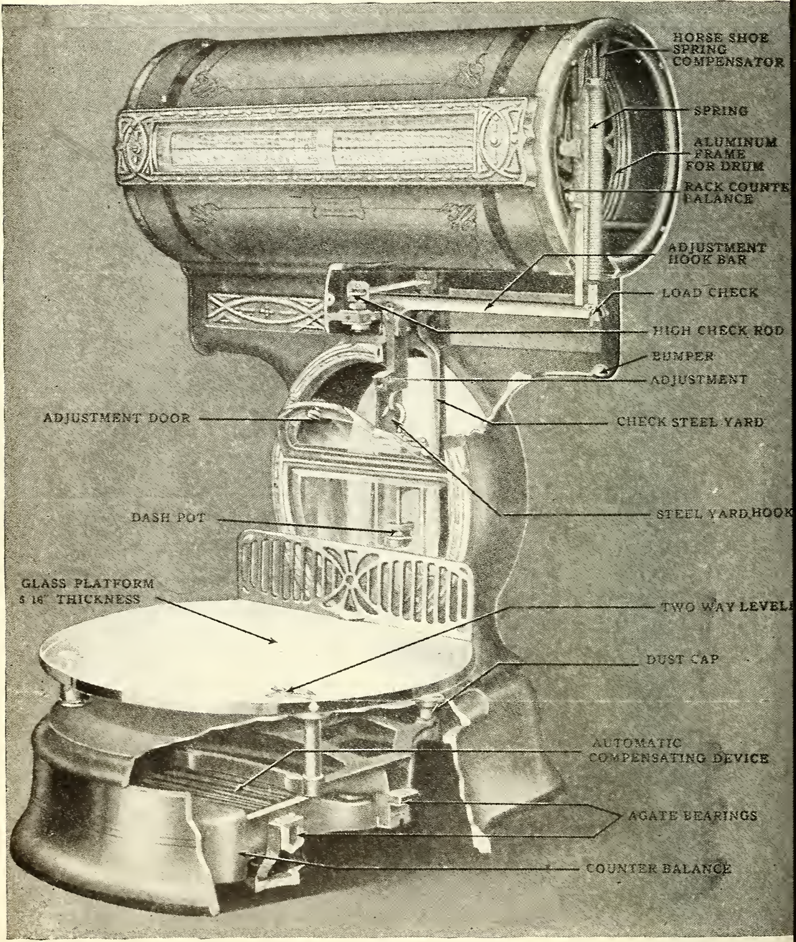
Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the Company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the Company in the unfair and contemptible position of having stated an untruth, or of having made any misrepresentation whatsoever.

Engineering Department
TOLEDO SCALE COMPANY



Dayton No. 344. Inside View

Note that the Dayton No. 344 is the plain and the No. 346 is the electric. In all other respects, as far as we have been able to observe, the two styles are identical.

One of the principal objections to the Dayton No. 344 and No. 346 is that they are spring weighing devices. The springs may be seen by removing the ends of the chart casing. Note particularly that round mirrors are used in the ends of the chart casing. They might have used plate glass, but that would reveal the springs, and the public is getting suspicious of springs; therefore, it is wise to conceal them. In other types of Dayton scales, they had used plate glass in the ends of the chart casing, so that the springs could be seen by the customer having purchases weighed over the scale. The fact that they have discontinued the use of plate glass in their latest model, would seem to indicate that they realized that the public was better informed on the subject than ever before and did not like spring scales. So the springs are concealed.

Look on page 52 for the detailed objections to the use of spring scales for counterbalancing the load in any sort of weighing device requiring accuracy.

The makers of these scales apparently realizing quite fully the essential inaccuracy of springs, have made an effort to overcome this defect by equipping the scales with a mechanical device known as the thermostat. But this device has been found a failure. It does not fully compensate for the change in the springs due both to changes in temperature and lapse of time, and the consequence is that constant hand-regulating of such scales to a correct zero position is necessary. And, when so hand-regulated to a correct zero position, they are almost certain to weigh inaccurately at many points between zero and full capacity.

Now the Dayton 344 has a thermostat similar to the thermostats used in some of the earlier types of Dayton scales. This thermostat is located on the lever. But the Dayton people by equipping the 344 and 346 with two additional thermostats up in the chart casing, confess that the thermostat in the earlier types did not perform the work and that additional thermostats are needed to help it out. But would you not say that if a thermostat has failed to perform the function for which it is designed, it is foolish to set another thermostat to correct it? If after long experience we discover that a fox always steals chickens, it would be foolish to get two more foxes to protect your poultry. Yet that is substantially what has been done in this newest Dayton scale.

Look at the illustration on page 92. Note near the bottom of illustration the words "automatic compensating device."—This indicates the thermostat as used in older Daytons, such as some of the 144's.

Now look at the very top where the words "horseshoe compensator" appear. This is the new thermostat and there is one at each end of the chart casing.

But consider the fact that the main thermostat is in the base of the scale; that the springs whose variation it is supposed to correct, are in the chart cylinder, high up above the counter. Suppose the scale is resting upon a refrigerator counter, the base would be very cold, the springs might be very hot, or at least the same temperature as the surrounding atmosphere. But suppose, further, that the scale is equipped with electric lights which heat up the cylinder housing. How in the world could the thermostat down in the base of the scale regulate the variation in the springs, due to a degree of heat which would not touch the thermostat? All of these things go to show that either the makers of the scale do no take the compensating device seriously, or else that they have been unable to make a device that would work under all conditions.

Remember, also, that in addition to the three thermostats which certainly ought to be expected to keep the scale in order, there is also a hand adjustment provided just below the chart casing.

But now let us consider those defects of the Dayton 344 and 346, which are in addition to the fact that they are spring-operated weighing devices.

These scales are equipped with ornamental scrolls which might easily accumulate dirt and verdigris, giving the scale an unpleasing appearance and producing an unsanitary condition.

The chart shaft is mounted in ball bearings. This might be an excellent thing were it not for the fact that this type of bearing consists of six steel balls mounted in a hardened steel case. Due to the manner of construction of the device (the case being of one piece and having no adjustment), it cannot be ground or polished after hardening, consequently a high degree of accuracy is impossible and much of the benefit that might ordinarily be obtained by the use of ball bearings, is lost.

Another serious objection is the use of two racks and two pinions to revolve the chart. This, in our opinion, is unnecessary and is certainly productive of additional friction.

Just note how, in this scale, friction seems to be compounded with friction and piled on top of friction, so that the error resulting from this unnecessary friction is multiplied as many times as the friction is multiplied.

There is no positive means of fastening the glass platter to the scale. It merely rests upon the four posts which project through the casing, consequently, the liability of the platter getting knocked off and broken, causing delay and expense in replacement, is quite serious.

On each one of the two forward posts which hold the platter, is a little nickel-plated disc which weighs three-quarters of an ounce. In cleaning the scale, these might easily be taken off and lost or forgotten, thus obliging the merchant to give about an ounce and a half of overweight on every draft. These also give the unscrupulous merchant a very convenient means for fixing his scale to give shortweight.

In looking over the objections to this scale, it would seem that, with the exception of the fatal springs, no one of these objections might be sufficiently serious to cause a merchant to decline to purchase. But when you consider the accumulation of little objections, when you think of one objection piled on top of another, until there is quite an alarming number of them, it does not seem possible that any merchant could be so short-sighted as to purchase this type of scale.

Further proof of the undesirability of Dayton money-weight, barrel-shaped, spring-balance computing scales, is that thousands of the most successful merchants have discarded them and substituted Toledos. Why have they done this? Why have the cleverest merchants gone to an enormous expense of this sort? There is a powerful reason why experienced business men act in this manner.

Here is a recent test made on a Dayton 344 scale that had been used only a short time:

Scale Leveled

70° temperature	22° temperature
Zero O. K.	1 ounce slow at zero
10 lbs. O. K.	10 lbs. 1 ounce slow
20 lbs. 1 ounce fast	20 lbs. ½ ounce slow
30 lbs. ½ ounce fast	30 lbs. 1 ounce slow

To these inaccuracies must gradually be added the inaccuracies resulting from springs that are weakened by continual tension.

On the chart of the scale examined, there are penny graduations up to and including 30 cents. From 31 cents to 60 cents, there are 2-cent graduations, but there is nothing to indicate this change other than the graduations themselves. This, as everyone knows, is a very dangerous style of chart as it renders it exceedingly easy for the merchant to make costly mistakes.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device, or to those who are contemplating its purchase.

Engineering Department

TOLEDO SCALE COMPANY

THE DAYTON FALSE CHART

Although the Dayton Scales with the false charts are pretty generally prohibited, it is nevertheless important that the salesman understand just exactly wherein these charts were false and how the customer was cheated.

Note the comparison which follows of the computing charts of a Toledo No. 381 and a Dayton No. 61 and No.

Toledo No. 381		Dayton Nos. 61 or 63
31	The number of prices per pound.........	24
14,992	Total number of money value graduations shown on chart......................	4,608
14,992	Total number of money value graduations that should be shown on correct chart.	9,012
None	Number of money value graduations shown that are incorrect............	3,072
14,992	Number of money value graduations shown that are correct................	1,536
None	Number of correct money value graduations omitted that should be on chart.	7,488
None	Number of money value graduations that shortweight the customer.............	2,028
None	Number of money value graduations that rob the merchant...................	1,044

63. It is well to study the comparisons carefully because these Dayton Scales are the ones which precipitated the nation-wide fight for honest weight, which fight resulted in such a tremendous amount of public interest in honest scales.

The same eccentricities in the placing of value figures that exist in the first pound on a Dayton 61 or 63 chart, practically exist in every one of the 24 pounds.

How is it possible for a computing chart to be correct and have the same money value figures repeated at the same price per pound so that different weights could be given for the same charge?

Example: Such repetitions at 4c, 5c, 6c, and 7c per pound.

How is it possible for a computing chart to be correct and have the same money value figures repeated so that the same weight could be given at different prices per pound for the same charge?

Example: For 2 oz. the money value figure 1 is repeated at eight different prices per pound, the money value figure 2 is repeated at eight different prices per pound, the money value figure 3 is repeated at six different prices per pound, the money value figure 4 is repeated at two different prices per pound. For 4 oz., 6 oz., 8 oz., 10 oz., 12 oz., and 14 oz., some money value figures are repeated at different prices per pound.

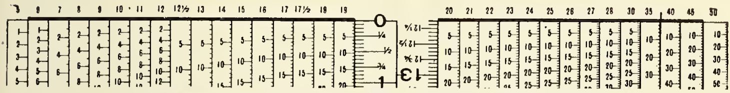
How is it possible for a computing chart to be correct and useful and have omitted many money value figures at practically every price per pound?

There are no 10c money value figures at the following prices per pound: 12c, 12½c, 14c, 15c, 17c, 18c, 22c, 23c, 24c, 25c, 28c, and 30c. At 30c per pound there are only eight money value figures, and of these only two are in the right position—so that the correct weight to be given cannot be determined for twenty-eight of the thirty money value graduations that should be shown. At every price per pound from 9c up money value graduations are omitted that should be on correct chart.

All the discrepancies on the 63 chart are due to the false method of graduating employed, viz. : money value graduations are given only for specific weight divisions of a pound. This method is fundamentally and totally wrong because it creates money values with fractions of cents which money values cannot practically be shown on a chart and any chart that disposes of these fractions of cents must give correct weight for many money graduations.

The only correct method of graduating a chart is illustrated by the cut herewith representing the first pound on a 381 Toledo.

Money value graduations are given for one cent money divisions of the price per pound, that is, there are as many graduations for each price per pound as there are cents in the price per pound.



The First Pound on a Toledo No. 381 Chart

Now let us look at the computations in the first pound on the false chart of a Dayton 61 or 63. In the cut shown the false values are in red figures.

The First Pound on a No. 61 and No. 63 Dayton-Moneyweight Chart

Priced per pound	4	5	6	7	8	9	10	11	12	12½	13	14	Ounces	15	16	17	18	20	22	23	24	25	26	28	30	Wrong	Right
	1*	1	1	1	1	1	1	1	2*	2	2	2	2	2	2	2	2	3*	3	3	3	3	3	4*	1	21	3
	1	1	2*	2	2	2	3*	3	3	3	3	4*	4	4	4	4	5*	5	6*	6	6	6	7*	7	8*	17	7
	2*	2	2	3	3	3	4	4	5*	5	5	5	6	6	6	6	7	8*	8	9	9	9	10	11*	11	21	3
	2	3*	3	4*	4	5*	5	6*	6	6	7*	7	8	8	8	9*	9	10	11	12*	12	13*	13	14	15	10	14
	3*	3	4	4	5	6	6	7	8*	8	8	9	10	9	10	11	11	13*	14	14	15	16	16	18*	19	21	3
	3	4	5*	5	6	7	8*	8	9	9	10	11*	12	11	12	13	14*	15	17*	17	18	19	20*	21	23*	17	7
	4*	4	5	6	7	8	9	10	11*	11	11	12	14	13	14	15	16	18*	19	20	21	22	23	25*	26	21	3
	4	5	6	7	8	9	10	11	12	13	13	14	16	15	16	17	18	20	22	23	24	25	26	28	30	1	23
																										129	63

The * shows figures ½ cent false. The ⊹'s at 9 ounces are for the man who claims he can take the mean value of 8 ounces and 10 ounces as indicated and get the value of 9 ounces. Each of the eight ⊹'s takes more than the customary ½ cent, and at 9 cents and 25 cents per pound 15-16 cent is taken.

As we have said, scales with these false charts are no longer, to our knowledge, being sold. But the salesman should be familiar with them, both because there still are many in use and because the fact of having ever made and sold such a device should be a sufficient commentary upon any concern to make merchants prefer not to deal with it.

Engineering Department.
TOLEDO SCALE COMPANY.

SCALES SHOWING INTENTIONAL VARIATIONS SHOULD NOT BE SEALED

In what an inconsistent position must the sealer of Weights and Measures find himself, when he places his stamp of approval upon a Dayton Moneyweight Barrel-Shaped Spring-Balance Scale on the chart of which there are many money value figures intentionally so placed as to cause the scale to shortweigh to the extent of 2 ounces and these being purposeful errors which result inevitably from the scheme on which the scale is built; and then turn right around and decline to seal or place his stamp of approval on an ordinary Pound-and-Ounce Scale in which there may be a much less error and an unintentional one.

Unavoidable variations in scales are not analogous in the slightest degree to intentional and recognized variations in the plan and constructions of the scale itself. In the case of an ordinary Pound-and-Ounce Scale, the scale is intended by the maker to be exactly accurate, and such scales are required by the Sealer of Weights and Measures to be readjusted in case of any appreciable error. But in the Moneyweight Barrel Scale the variations, amounting on the chart to a half-cent, are purposeful and result inevitably from the scheme on which the scale is built.

We insist, therefore, that such scales showing intentional variations are not correct and should not be sealed.

The Moneyweight Scale Company and its representatives attempt to justify the variations of a half-cent because of the so-called commercial usage by which the dealer takes advantage of the half-cent in making change. Under no circumstances can such a commercial usage justify the scale in taking the one half-cent. A computing scale is a mechanical calculator, not a change maker.

For a brief account of the litigation which finally resulted in the prohibition of the sale or use of scales showing intentional variations, see pages 9 to 17 of our Sales Manual or read our booklet entitled "Greatest Force in the World."

Engineering Department.

TOLEDO SCALE COMPANY.

HEAVY CAPACITY SCALES

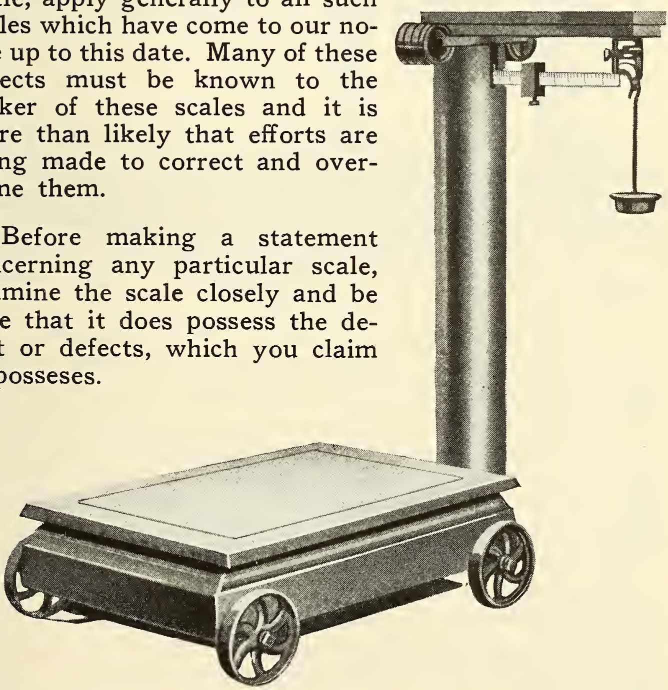
Let us now turn our attention for a moment to the defects of those heavy capacity scales which the Toledo salesman occasionally encounters. As a supplement to this material read carefully our booklet entitled "How Toledo Heavy Capacity Scales Save Time and Money." We will first take up the oldest type.

BEAM SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the old-fashioned Beam Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects, which you claim it posseses.



Common Type of Portable Beam Scale

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to tell the prospective purchaser of a scale all you may know about the construction of any scale under discussion.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

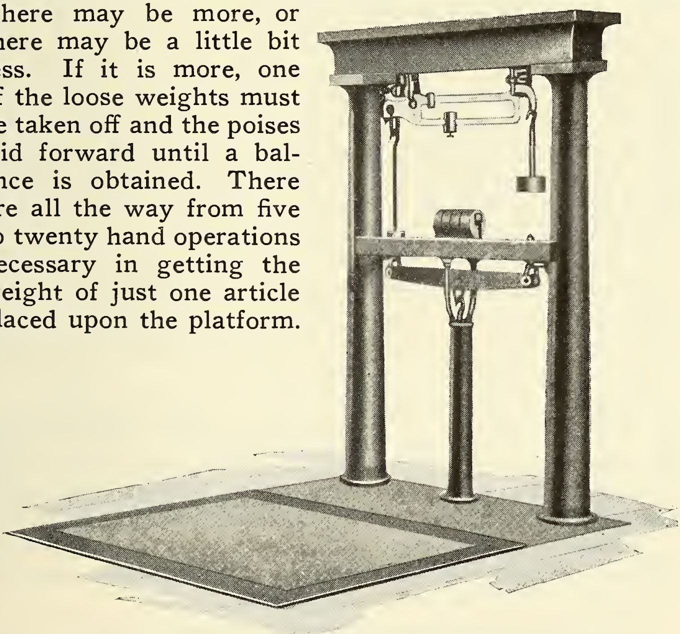
Engineering Department.
TOLEDO SCALE COMPANY.

For many years, the only heavy capacity scale obtainable was the old-fashioned beam scale such as is still used to a very considerable extent all over the world, and the fact that it is still used to a very considerable extent, is one of the reasons why there is such a tremendous field for the up-to-date Toledo Springless Automatic Weighing Machine.

One of the many objections to the old-style beam scale is that the weighing of any object upon such a scale is an extremely slow operation. This, of course, is not a serious matter at some country cross-roads where a load of hay has to be weighed perhaps once a week or certainly not oftener than two or three times a day. It is not a serious matter in the old-fashioned coal yard where perhaps only 40 or 50 weighings are made a day.

But there are many places where it is an exceedingly serious matter and is constantly becoming more serious. Therefore, let us consider the numerous processes necessary on the old-fashioned beam scale. We will suppose that a weight has been deposited upon the platform.

Now all of the poises must be shifted back to zero, and the loose weights taken off the end of the beam. Then loose weights must be added until the approximate weight of the article to be weighed has been reached. There may be more, or there may be a little bit less. If it is more, one of the loose weights must be taken off and the poises slid forward until a balance is obtained. There are all the way from five to twenty hand operations necessary in getting the weight of just one article placed upon the platform.



Common Type of Dormant Platform Beam Scale

In cases where there are a number of containers, such as boxes, pails, etc., to be weighed at the same time as the commodity is weighed, the tare must be deducted on the old-fashioned beam scale by very much the same process as weight is taken. In other words, a poise is slid along the beam. How easy it is under these circumstances to make incorrect mental calculations, resulting in costly errors.

Now, forgetting for a moment the time wasted in getting weights on the old-fashioned beam scale, let us consider the numerous possibilities for serious errors. Whoever does the weighing must add up the loose weights that have been placed on the end of the beam, and he must add to those the indications of the beam, and deduct from this any tare that there may be. Now these are simple enough operations for those accustomed to rapid mental calculations, but as a rule the men who regularly do the weighing are not accustomed to operations of this sort, resulting in much loss of time, because they are naturally slow at the work and increase the frequency of serious error. Loose weights are constantly being misplaced, and time is lost looking for them. Dirt and dust accumulating on the loose weights; rust and corrosion; pieces broken off when the weights are used for hammers, which is frequently the case; all increase the liability of incorrect weight.

Furthermore, in a beam scale with levers at a multiple of say, 100 to 1, and with an inch or so of play in the trig loop, this play may mean a difference of a pound or so. See our booklet entitled "How Toledo Heavy Capacity Scales Save Time and Money."

These are not mere theories on our part—they are facts proved time and time again by Toledo salesmen who have gone into plants where old beam scales were used and by checking the weights on Toledo Scales, proved to persons in authority that from $500.00 to $25,000.00 was being lost annually as a result of the time wasted and the inaccuracies that inevitably follow the use of old-fashioned beam scales.

We have hundreds of letters on file testifying to cases of this sort, so as we say, it is not a theory on our part, but is a fact that has been proved time and time and time again so conclusively that no intelligent person who carefully investigates the matter can for a moment doubt.

Another serious defect not only to the old-fashioned beam scale, but to many heavy capacity scales, is that the platform oscillates back and forth causing constant wear on the pivots and bearings of the scale even when the scale is not in operation. On the old-type scale, every time any one walks across the platform, every time a load is placed upon the platform, it oscillates back and forth and the bearings are subjected to a great deal more wear than they are subjected to in the ordinary operations of weighing.

If you want to get an understanding of what this wear means, take a sharp knife and press the blade directly downward upon a piece of hardened steel; to a very limited extent this will injure the edge of the knife. But now bear down heavily upon the blade upon a piece of hardened steel and then rock the knife back and forth. The edge will be rendered almost as dull as the proverbial hoe. That's the difference between the Toledo principle and the principle of the average heavy capacity scale, including practically all old-fashioned beam scales. In the Toledo Scale the razor-edge pivot which gives the scale such wonderful accuracy, does not oscillate when the platform oscillates back and forth. In other scales the pivot edge (usually the bearing oscillates upon the fixed pivot) does oscillate, resulting in constant wear and necessitating frequent and expensive repairs, or the sacrifice of all hope of accuracy.

Careful study by the salesman of the mechanism of these scales, and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.
TOLEDO SCALE COMPANY.

KRON SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Kron scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales, and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

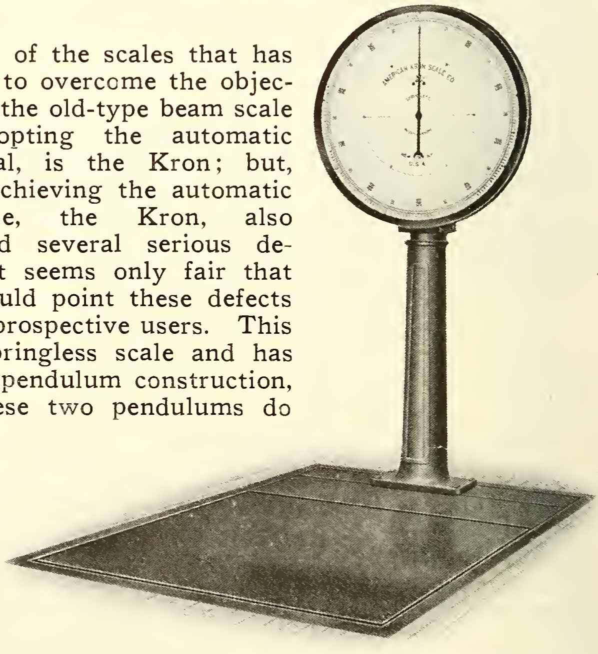
It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department,
TOLEDO SCALE COMPANY.

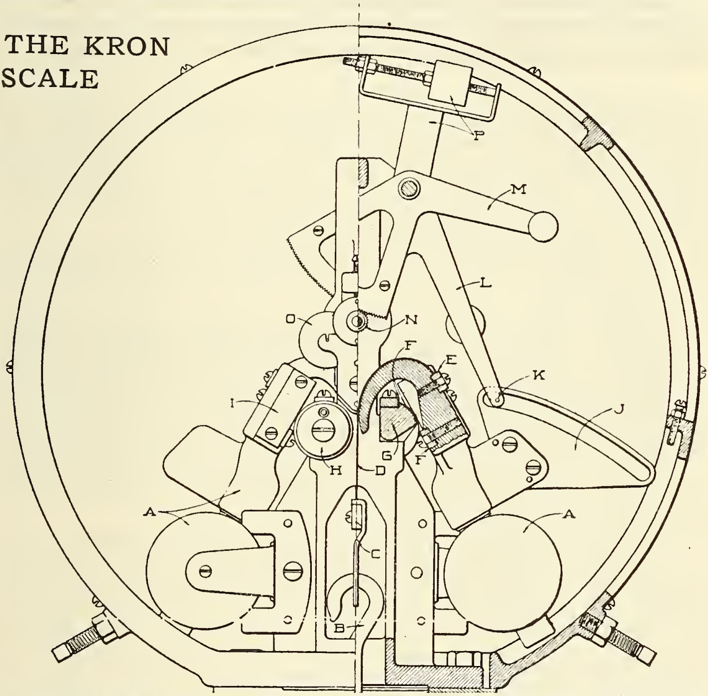
One of the scales that has sought to overcome the objection to the old-type beam scale by adopting the automatic principal, is the Kron; but, as in achieving the automatic principle, the Kron, also achieved several serious defects, it seems only fair that we should point these defects out to prospective users. This is a springless scale and has double pendulum construction, but these two pendulums do



Recent Type of Dormant Platform Kron Scale

not perform their functions as do the two pendulums in the Toledo. (*Continued on Page 108*)

THE KRON SCALE



A—Balance levers with weights. G—Fulcrum blocks from which the balance weights are suspended by a flexible piece of metal. H—Fulcrum rollers on which the balance levers have a rocking movement. F—Supporting bands of flexible metal by which the balance levers are suspended from the fulcrum blocks. D—Draft bands of flexible metal with fastening (E) on the balance levers. I—Steel plates fastened to balance levers rocking on fulcrum rollers (H). J—Cam giving positive adjustment at any point from zero to full capacity. L—Sector connecting with pinion (N) secured to pointer shaft.

When load is placed on platform, it is transmitted through draft rod (B), draft link (C), draft bands (D), with their fastening (E) to balance levers (A), to cam (J), to cam roller (K), to sector (L) to pinion (N), on pointer shaft which will indicate the load on the dial.

AMERICAN KRON SCALE COMPANY
39 Cortlandt Street, New York

Reproduction of a circular sent out by Ameican Kron Scale Company, showing weighing and indicating mechanism of the Kron scale.

On page 107 is a reproduction of a circular sent out by the American Kron Scale Company, showing the weighing and indicating mechanism of the Kron scale.

On page 111 is a reproduction of drawing showing one-half of the indicating mechanism shown on page 107. The drawing, however, is made on a larger scale for the purpose of making clear the reasons for our belief that the Kron scale will not stay in balance nor weigh accurately for any considerable length of time.

On page 110 is a list of the parts shown in the cut on page 111.

Now, refer to the illustration on page 111: A is the weighted balance lever supported by a metal ribbon passing over the fulcrum blocks G, the ends of the ribbon being fastened to the lever and the fulcrum blocks respectively. The cam Z is formed on the upper extremity of the balance lever and the ribbon D passes over the face of this cam and connects it with the steelyard rod B through the stirrup C.

When a load is placed on the scale platform, it will exert a downward pull upon the steelyard rod B and the ribbon D, causing the weight A and the balance lever to swing outwardly and up. This balance lever carries the driving cam J, having a slot S formed therein, the bearing surface V of which contacts with the roller K mounted at the lower end of the arm L, at the other end of which is the segmental rack meshing with the pinion N. This pinion N is fixed on the same shaft as the indicator hand. In order that the scale may weigh accurately, it is essential that the leverage distances Y and X bear definite relations to each other. When the roller H and the plates I are in perfect condition, the distance Y, from the center of gravity of the lever A to the point of contact Q with the roller H, will be a predetermined distance, also the distance X from the ribbon D to the point Q will be known and bear a definite relation to the distance Y. If the roller H or the plates I which are fastened to the balance lever, should wear, the distance X would shorten, causing the scale to weigh less than standard. On the other hand, should any rust or foreign substance accumulate between the roller H and plate I, as at the point W, it would tend to throw the plate I farther from the center of the roller G, which would also have a tendency to make the scale weigh less than standard.

Again, should any foreign substance collect between the plate I and the fulcrum block G, as at point F1, this would have a tendency to throw the scale off at zero, as well as weigh more than standard on the first part of the chart. When the plate I or fulcrum block G wear and particularly should they wear unevenly (which it is apparent they will do, as these parts will wear most at the point where the plate I contacts most frequently with the fulcrum block G), inaccuracy will result. Should the ribbon supporting the balance lever lengthen because of expansion, stretching or slipping, the balance weight A and lever would move downwardly and the distance X would be decreased, causing the scale to get out of balance at zero and weigh incorrectly.

As before stated, when loads are placed on the platform, the balance lever with the weight A and the indicating cam J move outwardly and upwardly, and the roller K will move in the direction of the curved line U, which movement is transmitted to the gear N on the indicating shaft.

Should the scale weigh inaccurately at any point on the dial, it can only be remedied by filing the bearing surface V on the cam J. Note: See last paragraph in their instructions, a facsimile reproduction of which is shown on page 114.

The roller K moves outwardly about 2½ inches for the full capacity of the scale. Hence, in a scale with a 2500-lb. chart, the roller K must move about 1/1000 of an inch for each pound. Think of the difficulty of filing 1/1000 of an inch and in the right place. On account of the angularity of the cam, should the scale weigh incorrectly, the slot must not be filed directly below the roller, but inward at an angle of about 90° from a line with the arm L, for on account of the angle of the slot S relative to the arm L, filing 1/1000 inch off cam J in line with arm L, would change the indication of a scale with a 2500-lb. dial about 1½ lbs. Thus, in a scale with

 (*Continued on Page 113*)

A —Balance lever with weights.

B —Steelyard rod connecting platform with indicating mechanism.

C —Draft ribbon connecting stirrup.

D —Draft ribbon.

E —Draft ribbon connection to balance lever.

F —Supporting ribbon connection to balance lever.

F2—Supporting band connection to fulcrum roller.

G —Fulcrum blocks from which the balance lever with weights are suspended.

H —Fulcrum roller.

I —Steel plates fastened to balance levers.

J —Cam bolted to balance lever.

K —Roller engaging surface of cam.

L —Sector arm.

M —Sector.

N —Pinion on indicator shaft.

P —Draft ribbon fastener.

Q —Fulcrum point on block G, i. e., where plate I contacts with fulcrum block.

R —Vertical line from point on cam where draft ribbon D leaves cam Z.

R1—Line through point of fulcrum for balance lever.

R2—Line through center of gravity of balance lever.

S —Slot in cam J controlling movement of roller K.

T —Screws securing cam J to balance lever.

U —Line of travel of roller K when balance lever swings outwardly.

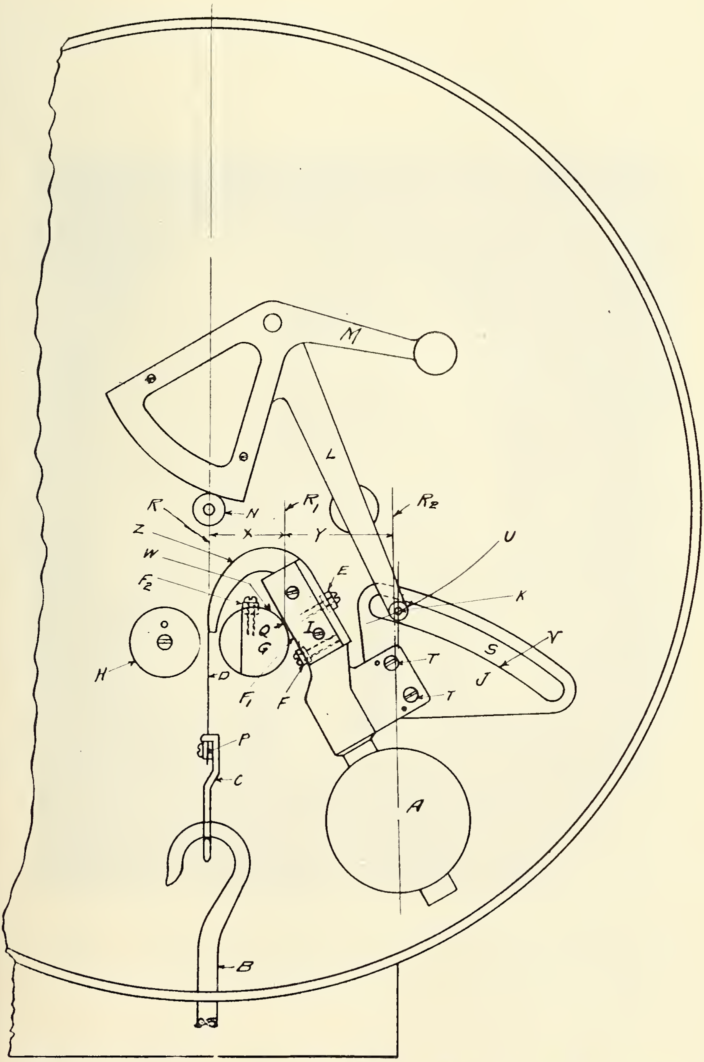
V —Contact surface in cam J which guides roller K.

X —Distance R to R1 equals the length of short lever arm.

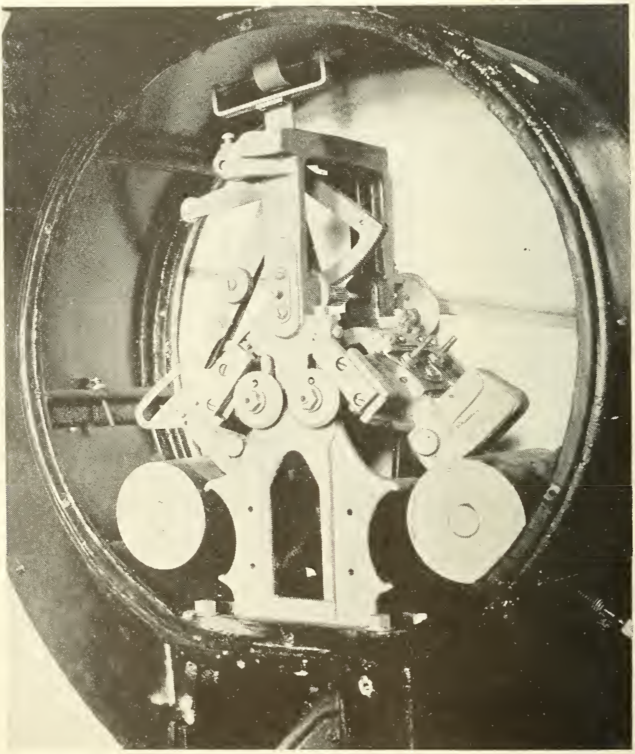
Y —Distance R1 and R2 equals distance from fulcrum point Q to center of gravity of balance lever, forming long lever arm.

Z —Cam formed on balance lever.

The above letters refer to the drawing on page 111. This is a list of parts for reference in studying construction of the Kron scale.



Reproduction of drawing, showing one-half of the mechanism of the Kron scale already shown in full on page 107. This drawing is on a larger scale to bring out more clearly some points to which we refer.



Halftone from photograph of Kron mechanism. This in connection with the reproduced drawings on pages 107 and 111, will help you still further to understand the defects in this scale, as explained.

1000 graduations, the cam would have to be filed at 1000 different points in order to make the cam correct at each graduation. The roller K works mostly in the slot S at and adjacent to the zero position, consequently, the zero position of the cam and adjacent positions will wear the fastest.

Further, on account of the roller K being small in diameter, there is a great tendency for it to wear, the hole in the roller wearing unevenly, whereupon the roller K will become eccentric, and the scale will weigh differently, according to which side of the roller is in contact with the cam J.

It will be readily understood that to file off the cam 1/1000 of an inch or less, requires a fairly good watchmaker. And as the bearing surface V on the cam J as well as the roller K will wear, and unevenly, it will be equally clear that this filing process must be repeated frequently in order to have the scale weigh with even approximate accuracy. When filing the surface V of the cam J, if, at any point, the cut is made too deep and too much material should be filed away, the whole remaining surface of the cam would have to be refiled to exactly that same depth in order to get the scale to weigh correctly on the different parts of the chart. Any one who has had any experience in filing will realize the tremendous job it would be to file this cam from one end to the other, especially when filing 1/1000 of an inch too much will throw a scale with a 2500-lb. chart off about 1½ lbs.

These scales have no shock-absorbing device between the balance levers and the indicator hand. Any jarring or sudden impact on the platform is instantly transmitted to the pinion N on the indicating shaft. This will have a marked tendency to destroy the accuracy of the teeth in the pinion N, as well as in the rack driving the pinion. The chances, then, are slight for the scale to remain accurate through constant and continuous usage, or in locations where dust and moisture can accumulate on the various parts.

Thus, inaccuracies in weighing will result from any of the following causes: *(Continued on Page 115)*

FAC-SIMILE

THE KRON SCALE

Automatic—"Load and Look"—Springless

Cleaning and Adjusting the Kron Scale:

All scales, whether of the latest automatic types or of the beam type, need a certain amount of attention and care to be able to give satisfactory and correct service.

The Kron platform is constructed entirely of steel, with all parts interchangeable, and if placed on a solid foundation and kept reasonably clean should give no cause for trouble.

In testing out a platform, it is important to place the test weights not only in the center of the platform but on each corner, and take the reading from zero to capacity; if all these points tally the platform is in perfect shape. If then any discrepancy is found between the weight placed on the platform and the weight indicated on the dial the trouble must be looked for elsewhere.

Then proceed from the platform through the intermediate lever to the draft rod, at the upper end of which you will find the yoke (V) on which the dash-pot (W) is suspended. This dash-pot should be removed and cleaned on the inside with a dry cloth, after which it is to be put back in its place. It is important that this dash-pot swings free and does not rub against the piston on any side; if, however, it is found rubbing against this piston, same can be adjusted at the piston bolt and nut (Z). When this is done the dash-pot should work free and frictionless.

To clean the mechanism, remove the balance weights and fulcrums by taking out the screws holding the fulcrum blocks (G) to the upright (Q); but before doing this remove pin holding cam roller (K), making the cam swing free from the sector, then clean the fulcrum blocks and the under side of the steel bands resting on the fulcrum blocks, also cleaning the surface of the fulcrum rollers (H) and the bearing surface of bearing blocks (I); after which the fulcrums with the balance weights are to be put back in their places.

In cleaning sector (L) and the pinion (N) on the pointer shaft a tooth-brush could be used to advantage. The pointer shaft rollers (O) and their bearings should be wiped clean. After all these parts are put back in their places, clean cam roller (K) and its bearings before attaching to the sector and also wipe the bearing surface of cam (J).

After this is done the indication on the dial should tally with test weights on the platform or the last adjustment is to be made on the cam (J).

The Kron Scale is the only automatic scale with a positive adjustment at any point on the dial from zero to capacity. This adjustment should be made by using a watch-maker's file as follows:

Find the low spot on the cam, fill in or take out shot from the shot cup to make this low spot correspond with the test weights; then file the balance of the cam lightly with a watch-maker's file until it is in perfect balance at each graduation as test weights are placed on the platform.

AMERICAN KRON SCALE CO.

39 Cortlandt Street, New York

Reduced facsimile of printed instructions for cleaning and adjusting the Kron scale, issued by American Kron Scale Company.

1. Lengthening of the band supporting the balance levers and weights, or the changing of position of the fastenings F and F2.

2. Foreign substances accumulating between the roller G and the ribbon, as at W.

3. Foreign substances accumulating between the plate I and the ribbon, as at F1.

4. Shifting of the plates I on the balance lever.

5. Wearing of the roller K, either at the center or on its surface, or both.

6. Wearing of the bearing surface V in the cam J.

7. Wearing of the teeth of the segmental rack or in the pinion N.

8. Dirt or foreign substances accumulating under the ribbon D on the cam Z.

9. Dust or foreign substances accumulating between the two ribbons D at points between the cams and the fastenings of the two ribbons.

Careful study by the salesmen of the mechanism of these scales and talks with those who have used and discarded them, may probably reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

FAIRBANK'S PLATFORM SCALE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Fairbanks Automatic Dormant Platform Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.
TOLEDO SCALE COMPANY.

The illustration on page 118 shows, as far as we know, the fourth attempt of the Fairbanks Company to produce a successful Automatic Scale.

We are informed that in a period of about three years, they have changed the entire principle four times and the detail of construction many times, all of which would indicate that they are doing their experimenting at the expense of the purchaser. It is only fair to point this out to prospective purchasers and ask them whether or not they want a scale of established correct principle like the Toledo, or one on which constant experiments are still being made.

The Toledo Floating Double Pendulum Heavy Capacity Scale is the product of an organization which has devoted itself exclusively for the past fifteen years to developing and manufacturing gravity automatic scales. The Toledo Heavy Capacity Scales have been on the market for five years without a single change in the principle of construction.

Workmanship and finish of the Fairbanks Scale is very inferior to the Toledo Standard. The housing is not dust nor moisture-proof. This is a noteworthy weakness, as the accuracy of the scale is impaired sooner or later.

The scale is only semi-automatic; but a small part of the capacity of scale is shown on the chart, the balance of the capacity being obtained by using one or all of the counter-poise weights, which means error inviting operations to engage or disengage these weights.

There are 22 bearings in the housing of a Fairbanks' dormant scale, none of which are self-aligning to the knife edges, against 8 in a Toledo, all of which are self-aligning.

Self-aligning bearings should add years to the life and accuracy of any scale.

The rotary movement of the toothed pinion which controls the weight indicator of the Fairbanks is derived from a toothed rack mounted on the upper end of a rack rod. At the lower end of this rod is a rack rod connection pivoted near the end of the main lever, farthest from the fulcrum of the lever. Any change in the seating of the fulcrum pivot of this main lever in its bearing due to rust, dirt, wear, or the lever shifting its position in this bearing, will cause the scale to change its zero indication.

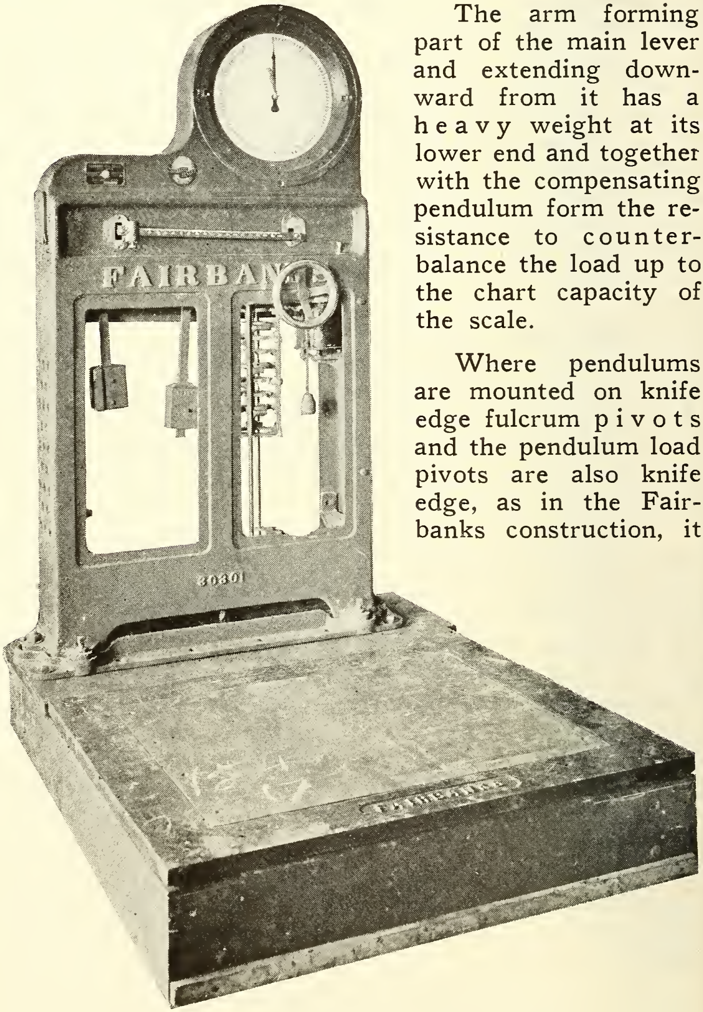
A steel pin is used to connect the rack rod bracket to the beam and there is, therefore, considerable friction at this point. The fit of this pin must be very free, and because of the great length of the rack rod, the error caused by this play is multiplied and allows the rack rod to rub against the guide at the top. This is a constant source of trouble.

The limited vertical travel of the rack rod necessitates the use of a pinion of very small diameter. The consequence of this is that the very slightest wear of this pinion results in the error being multiplied many times at the point of the indicating hand.

The limited initial capacity of the scale compels the operator either to turn the wheel for the purpose of throwing out of play one of the unit weights, or to press the button for the purpose of putting them into play at almost every weighing, and many times, several operations of button and wheel are required to arrive at the weight.

In the quick operation of putting the unit weights on or off they sometimes get out of position, which requires the front or back of housing to be taken off to get them back in place.

Another disadvantage is that the indicating hand does not read to zero after each weighing. Very few of these dials will indicate the same on the return movement of the hand as on the forward movement. This is due to friction and faulty construction.



The arm forming part of the main lever and extending downward from it has a heavy weight at its lower end and together with the compensating pendulum form the resistance to counterbalance the load up to the chart capacity of the scale.

Where pendulums are mounted on knife edge fulcrum pivots and the pendulum load pivots are also knife edge, as in the Fairbanks construction, it is impossible to have the mechanism register accurately to equal graduations on the chart.

To make this mechanism pull to as near equal graduations as possible, the pendulum weights only travel a short distance, and, to offer any resistance to counterbalance the load, must be extremely heavy.

In scales built on this construction, the graduations on the chart are generally made wide so that when accurate test weights are placed on the platform the indication will come somewhere on this graduation.

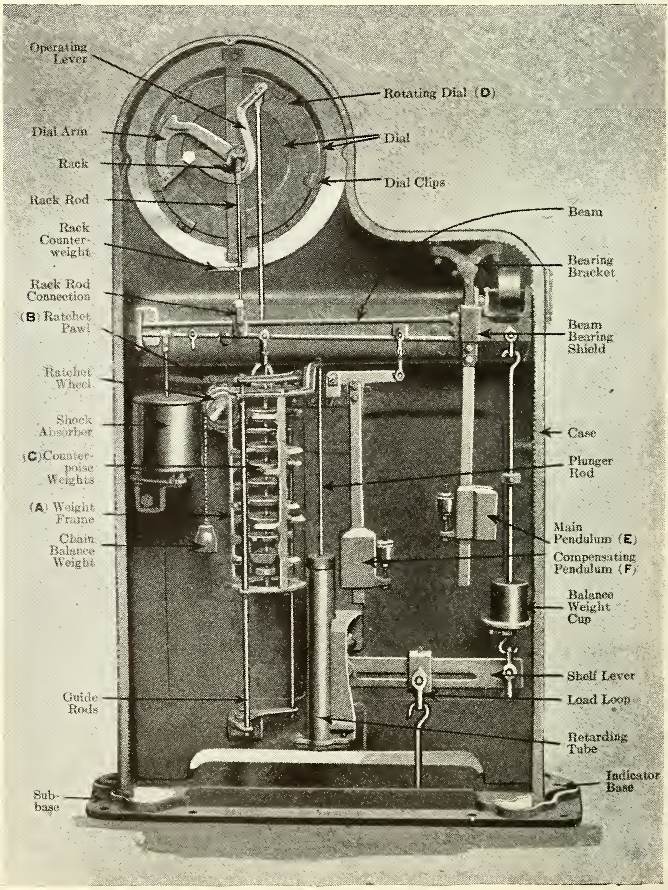
With the tremendous pendulum weights mounted on knife edge pivots moving such a short distance in relation to the movement of the weight indicator, the liability for error is much greater than in the Toledo construction.

In the Toledo Floating Double Pendulum Construction, the distance between the fulcrum of the pendulums and the pendulum weights constantly increases from a zero position to its full capacity. This allows very much smaller pendulum weights to be used. This construction also allows a much greater movement of the pendulum weights and an accurate adjustment to fine graduations which are equally spaced on the charts.

The continued durability and accuracy of an automatic scale depends to a very great extent upon preserving the accurate shape of the teeth of the rack and pinion which revolve the weight indicator. One of the exclusive points of the Toledo is the shock-absorbing feature, which is interposed between the toothed rack and its connection to the pendulums. Sudden shocks caused by heavy loads being placed suddenly on or off the platform and the effects of hard usage are taken care of by this shock absorber and the accuracy of the teeth of the rack and pinion maintained through a long period of time.

The Fairbanks Automatic construction has no such device and depends entirely upon the dash pot which does not take care of all the strain and wear which must come on the toothed rack and pinion.

The toothed pinion on the indicator shaft of a Fairbanks Dormant Scale is considerably smaller than in the Toledo, which could only result in a lesser degree of accuracy.



Rear view of Fairbanks with back removed. Compare crude appearance with a Toledo.

The Fairbanks Scales which we have seen have no mechanical adjustments to take care of all the inaccuracies which might occur in a scale of that construcion through continued use. The Toledo mechanism is so constructed that inaccuracies due to wearing of the parts through continued use are very remote, even though used for many years, but it is provided with mechanical adjustments to take care of all little inaccuracies due to long continued service.

The diameter of the chart is only 15 inches—making it practically impossible to show a graduation of even one pound for a chart of more than 200 pounds capacity.

There is no shock-absorbing means to prevent transfer of shocks to these delicate parts of the weighing mechanism—the rack, pinion and pinion shaft bearings. The rack for driving the pinion is so connected to the beam as to transfer the slightest shock directly to the pinion from the beam, so that any jar on the platform is immediately transferred to the indicating mechanism.

The target figures on the rotating dial back of the chart proper, show the added capacity figures through openings in the dial proper. The changing of figures in certain positions is dangerous, due to the fact that the operator is accustomed to reading the weight from the position of the hand rather than from the figures on the target back of the dial. This changing of figures is liable to cause serious error, especially when the scale is located in a place where there is not sufficint light to see the figures back of the dial.

The chart being very small in diameter, it is impossible to place figures to indicate the total capacity of scale and have a clear reading on the chart. Hence, the target figures are used, and as most of the loads weighed are in excess of the capacity of the chart, hand operations are required for both the adding of capacity weights and the removing of same. When the button is pressed, more weight than is wanted may easily be dropped off.

The pendulum weights travel a very small distance, due to the general principle of construction of the scales. This is made necessary in order to obtain an approximately correct weight on an evenly graduated dial. The connection between the compensating pendulum and the beam is such that a little jarring or shaking of the scale platform is liable to throw the scale off or out of balance at zero. This is caused by a slight shift of the compensating pendulum pivots in their bearings, due to the fact that the pendulums travel a short distance only and have a high multiple. The beam travels only a small distance where the rack for driving the pinion is connected, making it necessary to use a very small pinion in order to obtain a revolution. A small pinion of the same pitch must have fewer teeth, and will show greater error due to decreased size, and will increase the multiple of error shown on the chart by the indicator. The strain on a rack and pinion where a small pinion is used, is much greater and will not stand the wear and tear to which a scale of this type is subjected.

The clearance space between the capacity or unit weights and the stationary weight frame, is very small when the beam rocks to either extreme. A slight displacement or wear of these parts will allow the weights to come in contact and produce an error when the hand is close to zero or near the full capacity of the chart.

The dash-pot is very large, as it must be when coal oil is used, necessitating a large, heavy plunger. This plunger being connected with the beam, should the beam swing to the right or left, would cause undue friction by coming in contact with the walls of the dash-pot. Coal oil will evaporate and is very inflammable.

The housing containing the dial and pendulum mechanism is not dustproof or moistureproof. The housing has large openings for projections from the lever at either end of the tare beam. This will permit dust and moisture to enter the housing mechanism, which will rapidly destroy the pivot edges and the accuracy of the automatic weighing mechanism.

The case extends clear to the floor, and is entirely open at the bottom and also open both front and back between the sub-base and the case. There are also large circular holes in the sides of the case. This has a flue effect, and dirt and dust are carried from the floor up into the dial head and vital parts of the scale. This device cannot operate successfully under dirt, dust, or moisture conditions.

The housing sets in a sub-base and is equipped with four leveling screws, and must be set level and kept permanently level and plumb.

The main beam is a very light casting, and the manner of mounting the tare beam is such as to cause the main beam to spring against the sides of the trig loop if the screws in the tare beam are tightened securely, and this has caused considerable trouble in actual service. Because of its weakness, the beam has an extreme range in the pivot line. There is no beam-locking device. Tare beam is limited in capacity.

A slotted shelf lever is used with a movable-load pivot block. This block will gradually loosen in service because of loose fit of same to the lever, and is a dangerous contrivance to the user.

The main pendulum is fastened rigidly to the beam. Auxiliary or compensating pendulum is mounted with fulcrum bearing on a bracket fastened to the side of the dial case, and lever arm of this pendulum is connected to main beam by loop and flat-link connection, and must be kept directly under and parallel with the beam. This flat-link connection is at a right angle to the travel of the lever arm, and consequently, considerable friction is often developed in these connections. These pendulums cannot equalize when the device is out of level, as there is only one floating pendulum, the other being rigid and connected to the beam. Because of the weight of these pendulums, they must be removed in shipping, and this destroys the seal, as it is impossible to replace them in the position as originally sealed, necessitating resealing in the field. The movement of these pendulums is about six to eight degrees, and the scale lacks power to drive the pinion shaft. Any slight interference in the way of dirt or dust, or slight friction in any other part of the device, causes the hand to stick, and consequently results in errors in the indication.

The dash-pot is fitted with plain disk plunger, and the clearance of the disk in this pot determines the action of the indicating hand. It has no means of adjustment. The pot is filled with kerosene, and the opening for the plunger rod is about 1 in. by ½ in. Sudden shocks to the platform of the scale cause the kerosene to splash out, and kerosene is inflammable and dangerous. Because of this and natural evaporation, it is necessary to replenish the kerosene frequently. If the device gets slightly out of level, the plunger will rub against the side of the pot, and because of the great diameter (6 inches) and necessarily increased friction surface, serious errors in indication result.

The weight frame is suspended by a ratchet wheel with a chain. There must be clearance provided between each weight, and as there is only about 1/16 inch at most, it frequently happens that in the complete travel of the beam, the weights will contact with the fingers on the weight frame or on the upper movement of the beam with the weight above, before the indicator on the dial has completed its travel. The weight frame is operated by means of a button and wheel on the front of the dial case; and it often happens that the weights strike and fall off the carrier when this wheel is operated quickly, or when the kerosene in the retarding tube is low and the plunger not submerged. Hard shocks to the scale platform might also throw the weights off the weight frame.

The retarding tube is to check the fall of the weight frame, and same must be in exact parallel alignment with the weight frame guides to permit freedom of travel with the weight frame. It often happens that this will not travel the full distance on this account, or on account of the corrosion on the weight frame guide.

The pinion shaft has cup and point bearings requiring very delicate adjustment, and rust in these bearings is a very common source of trouble.

The indicating hand is permanently balanced and has no means of balancing except by filing butt or the tip of the hand.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

FAIRBANK'S PORTABLE

Toledo, Ohio, May 1, 1918.

The defects, as explained, of the Fairbanks Automatic Portable Scale, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the company in the unfair and contemptible position of having stated an untruth or of having made any misrepresentation whatsoever.

Engineering Department.

TOLEDO SCALE COMPANY.

The illustrations Figures 1, 2, and 3, pages 126 and 127 show the Fairbanks construction for portable scales and disclose the following:

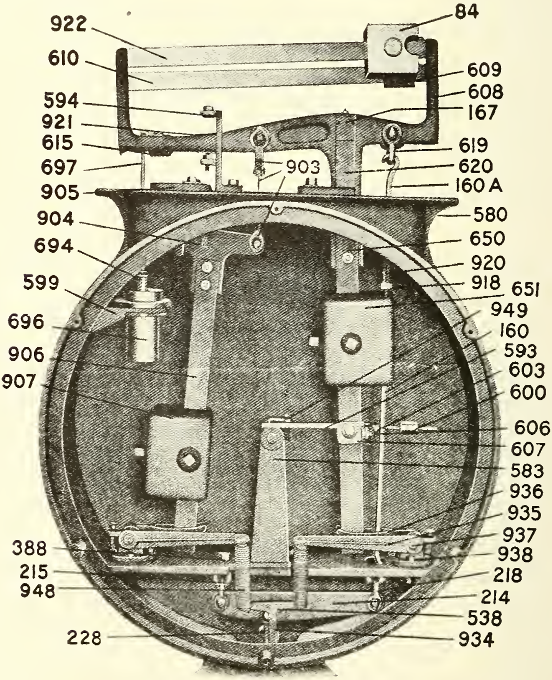


Figure 1

The Housing of scale is not dust nor moisture-proof. The Tare Beam Lever Casing No. 944, Fig. 2, has two openings in the top to support the beams above the casing. The Chart Housing has four openings at the top to accommodate the Main Pendulum Arm 650, the connection to the Auxiliary Pendulum (903), Steelyard Rod (160-A) and Dash Pot Connecting Rod 694. All of these openings would allow a tremendous amount of dust or moisture to enter the mechanism and soon render it inaccurate.

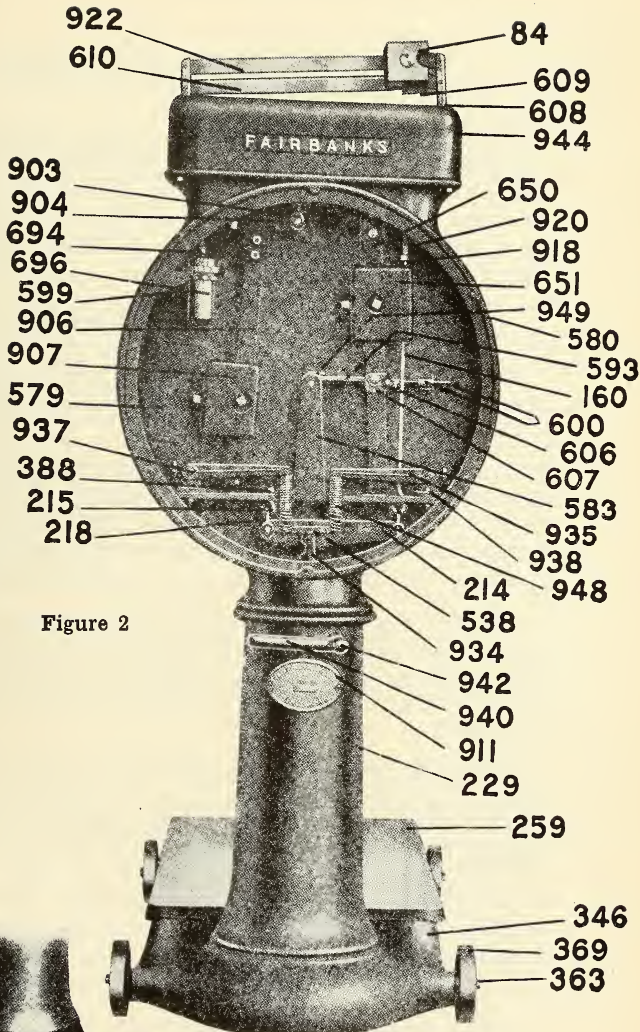


Figure 2

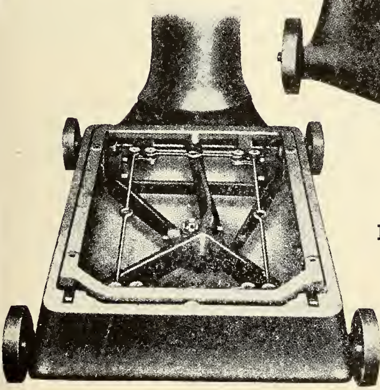


Figure 3

The Knife Edge Bearings for the Pendulums, Tare Beam Lever and Bench Lever (214, Fig. 2), are rigid and not self-aligning to the Knife Edges. In the Toledo construction all bearings are self-aligning. Self-aligning bearings materially decrease the friction and add greatly to the life and accuracy of a scale.

The Dial of the scale is located too low and does not give enough clearance from the platform. It would seem from the location of beams and dial that the beam equipment was the most important weighing feature of the scale.

The arm forming part of the main lever and extending downward from it has a heavy weight at its lower end (marked 651, Fig 1), and together with the compensating pendulum (907, Fig. 1), form the resistance to counterbalance the load up to the chart capacity of the scale.

Where pendulums are mounted on knife edge fulcrum pivots and the pendulum load pivots are also knife edge, as in the Fairbanks construction, it is impossible to have the pendulum register accurately to equal graduations on the chart.

To make this mechanism pull to as near equal graduations as possible, the pendulum weights only travel a short distance, and to offer any resistance to counterbalance, the load must be extremely heavy.

In scales built on this construction, the graduations on the chart are generally made wide so that when accurate test weights are placed on the platform the indication will come somewhere on this graduation.

With the tremendous pendulum weights mounted on knife edge pivots moving such a short distance in relation to the movement of the weight indicator, the liability for error is much greater than in the Toledo construction.

In the Toledo Floating Double Pendulum, the distance between the fulcrum of the pendulums and the pendulum weights constantly increases from a zero position to its full capacity. This allows very much smaller pendulum weights to be used. This construction also allows a much greater movement of the pendulum weights and an accurate adjustment to fine graduations which are equally spaced on the charts.

The continued durability and accuracy of an automatic scale depends to a very great extent upon preserving the accurate shape of the teeth of the rack and pinion which revolve the weight indicator.

One of the exclusive points of the Toledo is the shock absorbing feature, which is interposed between the toothed rack and its connection to the pendulums. Sudden shocks caused by heavy loads being placed suddenly on or off the platform and the effects of hard usage are taken care of by this shock absorber and the accuracy of the teeth of the rack and pinion maintained through a long period of time.

The Fairbanks Automatic construction has no such device and depends entirely upon the dash pot which does not take care of all the strain and wear which would come on the toothed rack and pinion.

The Fairbanks Scales that we have seen have no mechanical adjustments to take care of all the inaccuracies which might occur in a scale of that construction through continued use. The Toledo Mechanism is so constructed that the inaccuracies due to wearing of the parts through continued use are very slight, even though used for many years. However, it is provided with mechanical adjustments to take care of all little inaccuracies due to long continued service.

Careful study by the salesman of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department.

TOLEDO SCALE COMPANY.

THE HOWE AUTOMATIC SCALE

Toledo, Ohio, May 1, 1918.

The defects of the Howe Automatic Scale, as explained, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the Company that any statements be made about any of our competitors or their machines, which are not wholly and actually true down to the smallest particular.

We want our salesmen to fight hard for business, but always to be absolutely fair.

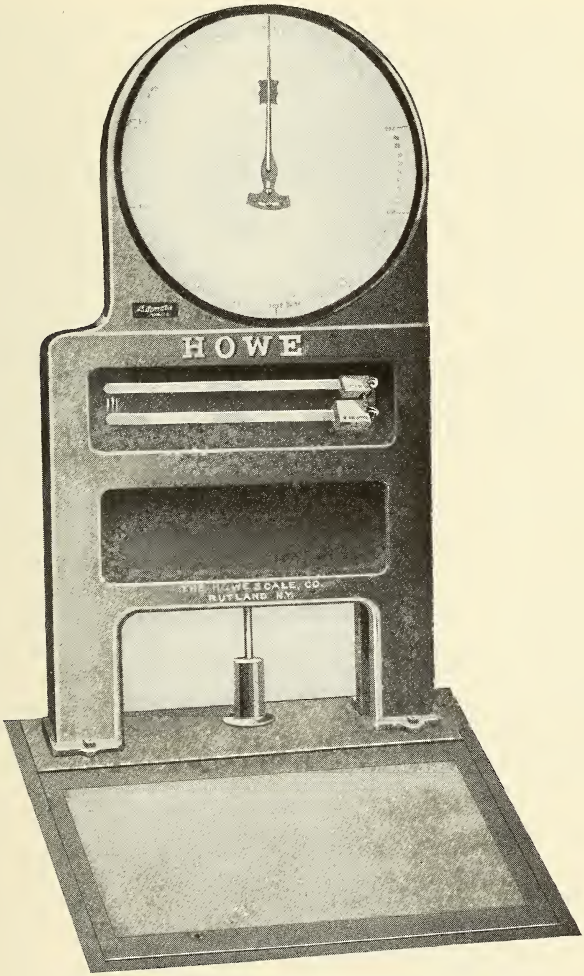
It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the Company in the unfair and contemptible position of having stated an untruth, or of having made any misrepresentation whatsoever.

Engineering Department,

TOLEDO SCALE COMPANY.

The workmanship and design are by no means up to the standard of requirements in a high-class automatic scale.

The pendulum mechanism is not enclosed in dustproof or moistureproof housing.



This is the Latest Type we have seen at Time of Going to Press

The connection between the levers below and the pendulum mechanism is direct. There is no shock-absorbing device, so that the shock due to a load being placed on the platform, is communicated directly to the rack and pinion and causes excessive wear to both, which results in great inaccuracies in a very short time. They have no equalizing bar. The means employed for accomplishing the purpose of an equalizer bar, is a roller which sets on the ribbon, the two ends of this ribbon being connected to each of the power sectors which form a part of the pendulum mechanism. This roller is recessed, having a little flange extending outward past the ribbon on either side. This forms a pocket for dirt. Unless the two power sectors and the roller are in perfect alignment, great friction might be caused by these flanges on the roller. Any dirt lodging in beween this roller and the ribbon on either or both sides of it, would result in inaccuracies. Particularly is this true at the zero position. Any defect in the ribbon or rust on the shaft running through the roller, would cause inaccuracies in the weighing of the scales. A great source of complaint against the Howe Scale is the fact that it will not remain at zero. This fact is largely due to a lack of pendulum power, as there is little or none at this point, and the above-mentioned conditions with reference to the roller and ribbons. Another source of trouble is the fact that the roller bearings on which the indicator shaft is mounted only revolve an amount backwards and forward sufficient to complete the revolution of the indicator. Hence, this constant wear at this particular point will produce great inaccuracy if by chance, when making an adjustment of the scale, these rollers are changed from their original position after having been used some time.

The suspension bearings on which the platform rests, are so constructed that every particle of movement of the platform when loading or unloading the scale, causes an equal amount of oscillation or rolling effect on the lever pivots, which of necessity causes excessive and rapid wear, and in turn causes great inaccuracies in weighing. To overcome this defect, small metal spheres set in cups, are used, four of which cups are in the top of the spider; the other four on the lower part of the platform. These cups are made a little larger than the balls, permitting a little action to and fro to the platform. However, these balls when the platform is forced one way or another, must come to a sudden stop when they contact with the outer edge of the cups in which they set. The balls are not perfectly round, nor are the cups finished so as to allow a free, easy, rolling movement of the platform backwards and forwards over these balls. There is an effect, due to these imperfect balls, similar to the effect produced by rolling a hexagon nut between two planks. These balls soon become worn, and cannot roll, so that any beneficial result they might have had at outset is lost.

Most, if not all, of the Howe Scale platforms, as well as the frames, now in use are made of wood. The weaknesses of such a platform and frame compared to the high-grade Toledo steel frames and gray-iron platforms, are very evident.

Most of the Howe levers have the side pull, and the fulcrum and load pivots do not run through the lever. The disadvantage of this is evident. It has a tendency to cause a yielding side torsion on the pivots, causing inaccuracies in weighing when heavy loads are weighed.

The main beam or counterbalance weight to counterbalance initial pull of lever, has a tendency to swing. This has the effect of keeping the indicator in constant motion, preventing it from coming to a positive stop. The average weight of this counterbalance is about 20 pounds.

The locking device on portables is inoperative when scale is out of balance, due to the fact that there is no means for relieving the pull on the pendulums. Thus, if the scale is out of balance, these pendulums swing out of position so that only one or neither of the weights can be locked. Should only one weight be locked, the force exerted on this is so excessive that it strains the ribbon or cam sufficiently to cause inaccurate weighing when released.

Owing to the 45-degree angle of travel of their cams, instead of moving in an upright and downward position as on Toledos, it is almost impossible for them to get an accurate indication on the chart weighing forward and backward.

The rack is connected directly to the beam, thus concentrating a large percentage of shocks and all vibrations directly on the rack and pinion.

They have no shock-absorbing feature nor compensating device. It is absolutely necessary to level head device and to place level on leveling points of head continually, owing to lack of compensating feature.

There is no method of getting a gravity range on their beam so as to balance in any position, thus causing a different indication at different points on the dial on a uniform, graduated chart.

When the power or weight is taken off the platform, the power removed from the pendulums traveling on 45-degree angle is not as great as power in straight upright position to bring indicator back to zero.

Howe Company tries to minimize these errors by 6 to 8 degrees travel of pendulum. This, we believe, is an error.

Howe dial and dial mechanism are not hermetically sealed; they should be by all means or scale will not continue to weigh accurately.

Kerosene is used in dash pot; it is highly inflammable and creates a fire hazard. By spilling out on case and very often discoloring the dial chart and completely covering lower part of dial housing it creates not only a dangerous but a very unsightly condition.

To keep scale in balance it must be balanced several times a day.

HOWE GUARANTEE

"We guarantee our automatic scales to be free from defects in material and to weigh as accurately as can be expected of a device of this kind where rapidity is paramount. We could state, however, that under proper use and care the degree of accuracy would be within the smallest division of the dial graduation, providing the scale and device are kept level and plumb and are handled in accordance with our instructions."

Howe does not claim dial or automatic scale is more accurate than beam scale — in fact, the factory plainly instructs all agencies and all salesmen that to attain rapidity you must sacrifice accuracy.

Ask the man who has one or ever had one.

Careful study by the salesmen of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device or those who are contemplating its purchase.

Engineering Department,
TOLEDO SCALE COMPANY.

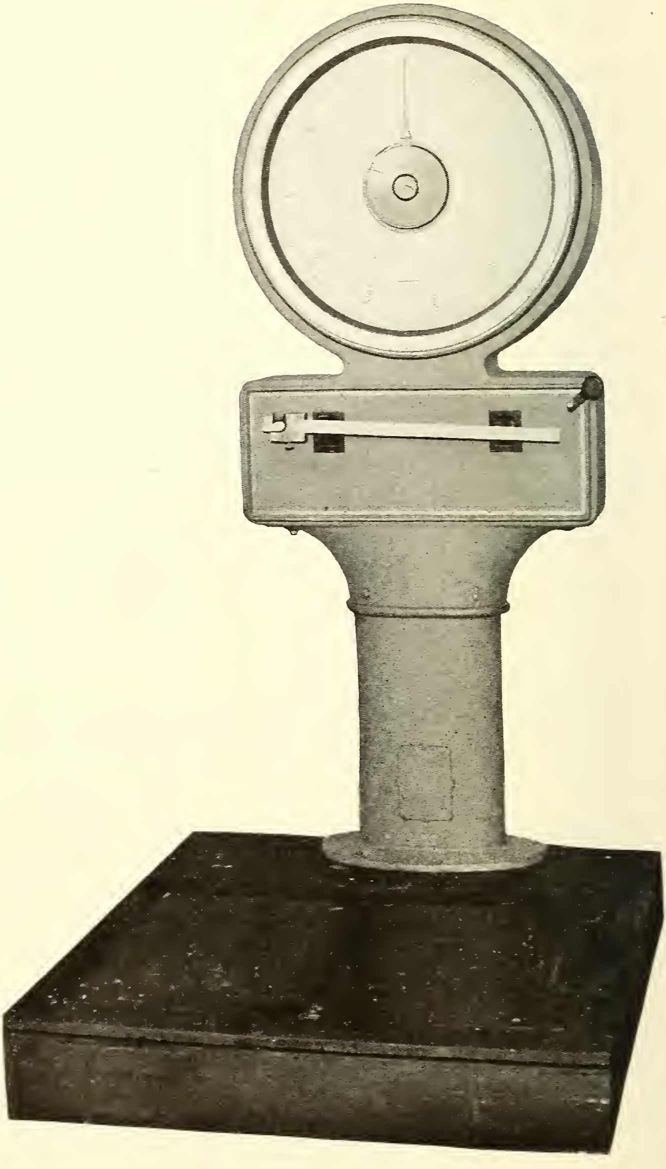
THE AMERICAN MATERIALS COMPANY AUTOMATIC SCALE

Toledo, Ohio, May 1, 1918.

The defects of the American Materials Automatic Scale, as explained, apply generally to all such scales which have come to our notice up to this date. Many of these defects must be known to the maker of these scales and it is more than likely that efforts are being made to correct and overcome them.

Before making a statement concerning any particular scale, examine the scale closely and be sure that it does possess the defect or defects which you claim it possesses.

It is neither the policy nor the desire of the Company that any statements be made about any of our competitors or their machines which are not wholly and actually true down to the smallest particular.



American Materials Scale

We want our salesmen to fight hard for business, but always to be absolutely fair.

It is your duty and obligation to point out the defects of any scale which may be under consideration. But never put yourself and the Company in the unfair and contemptible position of having stated an untruth, or of having made any misrepresentation whatsoever.

Engineering Department,

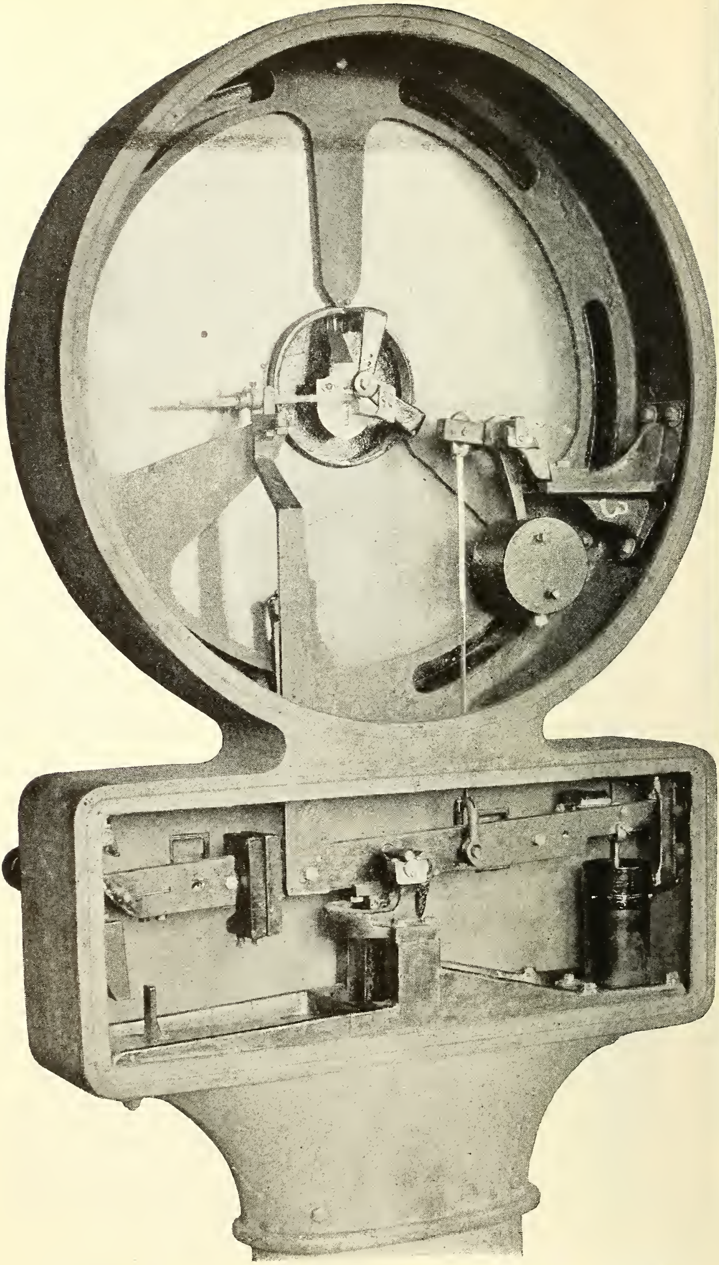
TOLEDO SCALE COMPANY.

The American Materials Company started to build automatic scales only a short time ago and evidently did not have any definite and decided principle of construction in mind. This is indicated by the fact that they have changed their entire principle of construction twice and the detail of their construction many times.

In the American Materials Scale, all the bearings for the pivots in the levers are rigid, hence the pivot edges will not have uniform pressure in the bearings and when shifting the levers, the pivots will move in the bearings, changing the indication of the scale and wearing the pivot edges very rapidly, producing an inaccurate scale.

The pinion, to which is attached the indicating hand, is driven from an arm which is rigidly fastened to the tare beam lever, so that any change in the seating of the lever fulcrum pivot in its fulcrum bearing due to rust, dirt, wear, or the lever shifting its position in this bearing, will cause the scale to change its zero indication.

As the pendulums are constructed with both fulcrum and load knife-edge pivots, it is not possible to obtain equal graduations on the chart unless approximate accuracy only is desired. To make this mechanism pull to as nearly equal graduations on the chart as possible,



View of Mechanism, American Materials Scale. Compare Crude Appearance with the Beautiful and Correctly Designed Mechanism of a Toledo the pendulum weights move a distance of about one inch, consequently, these weights must be tremendously heavy in order to give the scale the desired capacity. The multiplication of the one-inch movement of the pendulum weights into the movement of the indicating hand for one revolution around the chart, is about 78 to 1. In the Toledo this multiplication is practically 10 to 1. With the tremendous pendulum weights mounted on knife-edge pivots and moving such a short distance in relation to the movement of the weight indicator, the liability for error is exceedingly great.

The continued durability and accuracy of an automatic scale depends to a very great extent upon preserving the accurate shape of the teeth of the rack and pinion which transmit the rotary movement to the indicating hand.

The pinion on the indicator shaft on the American Automatic Scale, is considerably smaller than on the Toledo, which can result only in a lesser degree of accuracy. The American scale has no adjustment to take care of any inaccuracy that might occur except at zero and full capacity. If the scale should not weigh correctly in an intermediate position, no means is provided for correction.

The housing containing the American automatic mechanism, is not dustproof. The teeth in the rack operating the pinion are turned upward and are unprotected. These teeth will in a short time catch dust and dirt, producing inaccuracy.

Chart housing of American Automatic Scale is not dustproof and dust would settle in the teeth of rack which is inverted, and errors would result.

Finish of scale and parts, both outside and inside, cannot compare with the Toledo standard.

A type of American Automatic Scale which is being sold to packing houses for the same class of weighing for which we furnish the Toledo Short Column Portable mounted on an adjustable elevated stand, has the following objections:

1st—Platform construction of base of scale is of wood and is mounted on an iron framework with no wheels.

2d—Automatic mechanism is as above described and could not be made into a satisfactory portable scale.

3d—No locking mechanism.

4th—No beams.

5th—Chart of 200-pound capacity and graduations on same are about 4 ounces wide, which would not result in accurate weighing.

Careful study by the salesmen of the mechanism of these scales and talks with those who have used and discarded them, may possibly reveal other serious defects. It is only just to point these out to those who are still clinging to this type of weighing device, or those who are contemplating its purchase.

Engineering Department,

TOLEDO SCALE COMPANY.

THE BLADE PRINTING & PAPER CO.
TOLEDO, OHIO